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THE Journal OF THE
AMERICAN DENTAL ASSOCIATION
JUNE 1949 • VOLUME 38 • NUMBER 6

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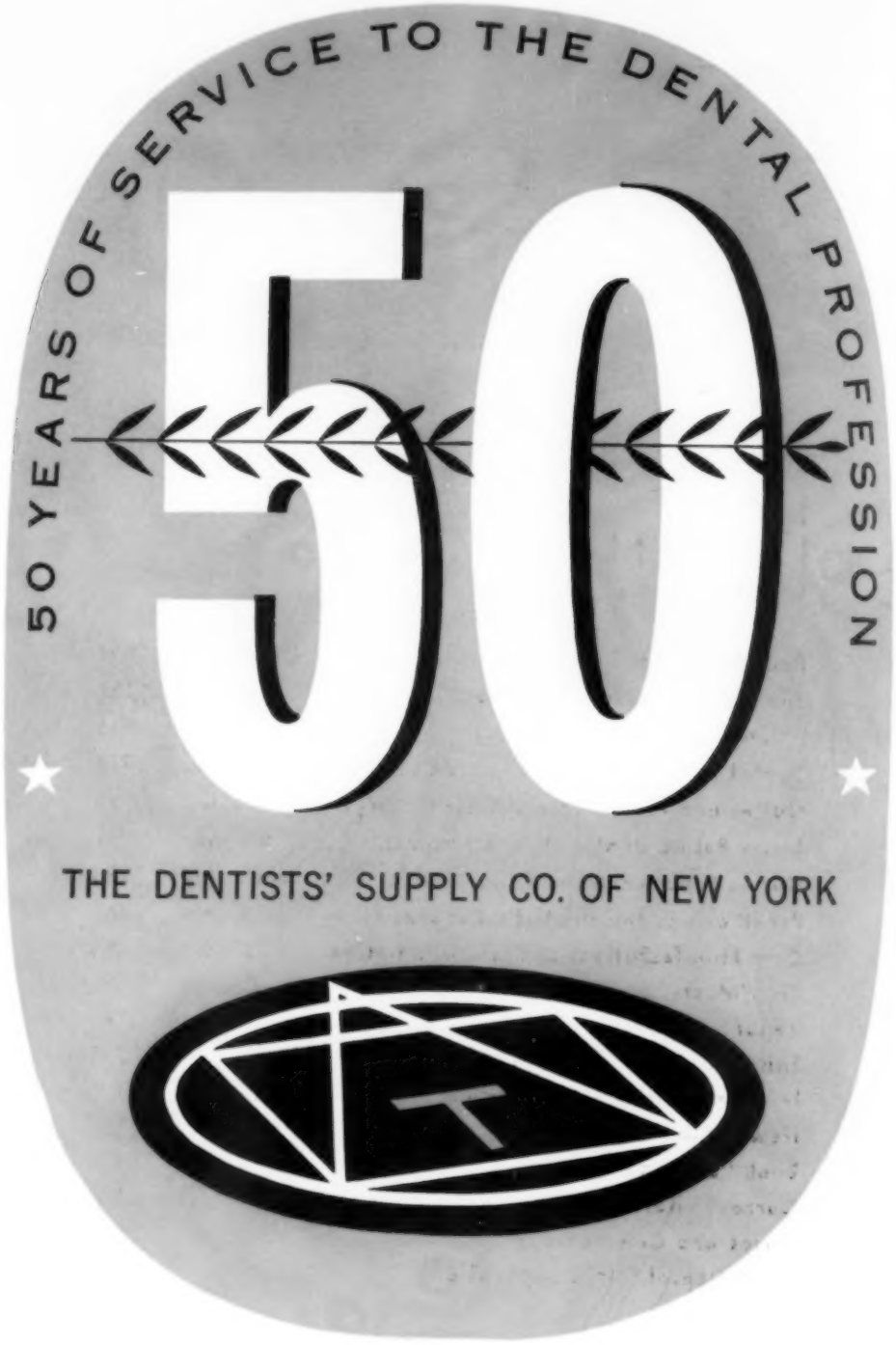

The Journal of the American Dental Association, Vol. 38, No. 6. Published by the American Dental Association, 222 E. Superior St., Chicago 11, Ill. Yearly subscription $7.00 for U. S. and possessions; $8.00 for foreign countries. Single copy seventy-five cents. Entered as second-class matter, December 31, 1947, at the postoffice at Chicago, Ill., under the act of March 3, 1879. Published monthly. Copyright 1949 by the American Dental Association. The Journal of the American Dental Association is indexed in the Index to Dental Literature and, in part, in the Quarterly Cumulative Index Medicus, Biological Abstracts and Chemical Abstracts.

THE Journal OF THE
AMERICAN DENTAL ASSOCIATION

JUNE 1949 • VOLUME 38 • NUMBER 6

THE ACCURACY AND PRACTICAL VALUE OF RECORDS OF CONDYLE PATH INCLINATION

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For many years prosthetists have used or at least recommended making wax intraoral records after the method of Christensen (Fig. 1) for adjusting horizontal condylar guidance on adaptable articulators. More recently, the method has been extended to the adjustment of articulators in mounting casts of natural teeth for the diagnosis of malocclusion. In the literature, however, there is little evidence that the reliability and validity of the procedure have ever been seriously questioned or established.

Reliability is here taken to mean the ability of a measure to yield the same result when applied on separate occasions to the same phenomena. The validity of a measure concerns its ability to report what it pretends or is intended to report and its correlation with other criteria. Among questions which await answers in this field are the following:

1. Over what distances do the condyles actually move in lateral and protrusive movements of the mandible while the teeth remain in functional contact?

2. Can the inclination of the functional condyle path be reliably measured over such distances by intraoral methods?

3. If it can, is it worth recording? If it cannot, does it matter?

4. What is the order of precision of such measurements?

5. What are the practical consequences of varying degrees of deviation by an articulator mechanism from the patient's actual functional path?

6. Is this path straight over the 6 mm. of protrusion commonly employed in securing such records?

7. What is the correlation, if any, between the condyle path, as deduced from intraoral records, and the anatomic inclination of the articular surface of the glenoid fossa as determined by roentgenographic tracings?

This investigation is directed to answering these and related questions and to clarifying a subject in which there has long been uncertainty and confusion in both theory and practice.

Prize winning essay read before the midwinter meeting of the Chicago Dental Society, February 9, 1949.

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The literature describing various clinical intraoral methods of recording condyle path inclination and transferring such records to an adaptable articulator is extensive. Also, since the beginning of the present century, there has been a somewhat strenuous insistence on the value of the procedure by those who claim to practice it. But it is difficult to find, for example, literature offering convincing proof of the superiority of dentures the occlusion of which has been built to conform to such individual records, as compared with those built on an articulator which merely reproduces an average condylar guidance. So far as I am aware, the nature and magnitude of the discrepancy which occurs when individual records are neglected have not previously been demonstrated.

Articulators

Articulators are of three main types: (1) fully adaptable or adjustable anatomic articulators, (2) fixed average anatomic articulators and (3) plain line or hinge articulators on which the reproduction of chewing movements is impossible.

For the purpose of this investigation, and indeed for many others, articulators built on spherical or other geometric concepts of occlusion and mandibular movement rather than on anatomic concepts may be disregarded.

It is probable that anatomic articulators comprise only a small proportion of those used throughout the world. This view can be confirmed by an inspection of dental offices and laboratories in any country. I have letters from manufacturers of articulators recording the proportions of the different types sold. Some manufacturers have admitted making only one type, but those who make all varieties have reported that sales of the plain line type constitute 90 per cent of the total. Since the customary technic of adjusting condylar guidance is neither difficult nor time consuming, it may be concluded on the evidence that the dental profession, after nearly half a century of exhortation, is still not convinced of the value of adaptable articulators and that their use is mainly confined to dental schools (and not all these) and a few specialist practitioners. It may be noted in support of this contention that any adaptable articulator seen in a dental office can be, and frequently is, used as a plain line or average instrument, its adjustable features being ignored.

Until the issue is decided, the general practitioner cannot be blamed for following the line of least resistance. For years he has been either entertained or perplexed by disagreement among the experts, who, moreover, have been observed at times to shift their ground. Gysi,[1-3] the most distinguished and reliable contributor in this field, after several years' advocacy of fully adaptable articulators, produced and marketed two average ones. His most recent pattern is again adaptable. Hall[4-8] has at various times advocated all three types with no evident embarrassment; and at the present moment, after a comparatively sane interval of 20 years, there is a revival of enthusiasm for spherical theories of occlusion, most of which completely ignore the existence of condyle paths. Although

1. Gysi, Alfred, The Problem of Articulation. *D. Cosmos* 52:1 (Jan.), 52:148 (Feb.), 52:268 (March), 52:403 (April) 1910.

2. Gysi, Alfred, Some Reasons for the Necessity of Using Adaptable Articulators. *Brit. J. D. Sc. & Prosthetics* 78:303 (Nov.) 1933.

3. Gysi, Alfred, Practical Application of Research Results in Denture Construction. *J.A.D.A.* 16:199 (Feb.) 1929.

4. Hall, R. E., Movements of the Mandible and Approximate Mechanical Imitation of These Movements for the Arrangement and Grinding of Artificial Teeth for the Efficient Restoration of Lost Masticatory Function in Edentulous Cases. *J. Nat. D. A.* 7:677 (Aug.) 1920.

5. Hall, R. E., Full Denture Construction. *J.A.D.A.* 16:1157 (July) 1929.

6. Hall, R. E., An Analysis of the Work and Ideas of Investigators and Authors of Relations and Movements of the Mandible. *J.A.D.A.* 16:1642 (Sept.) 1929.

7. Hall, R. E., An Analysis of the Development of the Articulator. *J.A.D.A.* 17:3 (Jan.) 1931.

8. Hall, R. E., The Problem of the Articulator (Balanced Occlusion). *J.A.D.A.* 21:446 (March) 1934.

this essay is not concerned with articulators as such, they are mentioned because they provide convenient evidence of the state of indecision which has been and still is associated with the subject of condylar guidance and its significance.

Protrusive Registration

Standard textbooks on prosthetic dentistry as a rule have evaded the issue, the more respectable ones proceeding to a description of methods of recording the condyle path without pausing to question their necessity. Swenson[9] stated: "There seems to be confusion in the minds of many as to what a protrusive registration is intended to attain." Unfortunately, the author did nothing to resolve the confusion. He continued: ". . . for practical purposes, we register only the first part of the path, a distance of approximately six millimeters." Nowhere in the comprehensive and otherwise excellent chapters on occlusion did he make any reference to why the condyle path should be measured or what happens if it is not.

Schlosser[10] took the matter a little further when he said: "The average functional range rarely exceeds 4 mm.; and while this much protrusion will suffice to set the controls, the 6 mm. record will hold the articulator mechanism more securely." But with this brief reference he left the matter, and throughout the text, untroubled by the possible consequences of employing what is expedient rather than valid, he advocated a protrusion of 6 mm. This approach is representative of textbook literature on the subject, and no useful purpose would be served by quoting other authors similarly concerned with the technic rather than the significance or reliability of the measurement secured.

If intraoral records are to be used, it would seem reasonable to call not for some arbitrary protrusion, such as 5 or 6 mm., but for precisely that amount of protrusion which, with the finished dentures in the mouth, will bring the incisors into edge to edge relation. This opinion has been well expressed recently by Owen,[11] who advocated determining the required amount of protrusion only after the anterior teeth have been set up. But if a natural incising relation involving a protrusion of only 2 or 3 mm. is recorded, it will be found that the condyle paths on the articulator cannot be adjusted by means of such a record except within a wide range of error. Alternatively, if a protrusion of 6 mm. or more is recorded the operator can set the controls with greater accuracy, but the position so recorded and reproduced will be one that the patient will never use, and the inclination so obtained may, but probably will not, coincide with that of the much smaller functional range of the path. For some years prosthetists have remained on the horns of this dilemma without realizing or admitting the discomfort of their situation.

Reliability

Periodical literature is somewhat more fruitful of a realistic and critical attitude to the problem. The most emphatic condemnation of the Christensen method appeared in a statement by Gysi:[3] "Check bites with wax or compound are necessarily so unreliable as frequently to lead prosthetists into grave errors." In the same article he said: "We have never been able to get the same registration twice on the same patient at the same sitting and I have never found any one who could. The results differ from 5 degress to 25 degrees above or below the individual conditions." French[12] ex-

9. Swenson, M. G., *Complete Dentures*, ed. 2. St. Louis: C. V. Mosby Company, 1947.

10. Schlosser, R. O., *Complete Denture Prosthesis*, ed. 2. Philadelphia: W. B. Saunders Company, 1946.

11. Owen, E. B., The Condyle Path: Its Limited Value in Occlusion. *J.A.D.A.* 36:284 (March) 1948.

12. French, F. A., The Intra-Oral Versus the Extra-Oral Method of Recording Mandibular Measurements. *J.A.D.A.* 16:1100 (June) 1929.

pressed an exactly contrary view: he favored the intraoral method and stated that the alternative Gysi extraoral method was completely unreliable. But he presented no data or experimental evidence, and the wording of his statements reflected the highly emotional nature of controversies in the prosthetic field at that time, and to a lesser extent at present. The only conclusions that might be drawn from unsupported statements of this kind are that both methods are possibly unreliable and that the protagonists

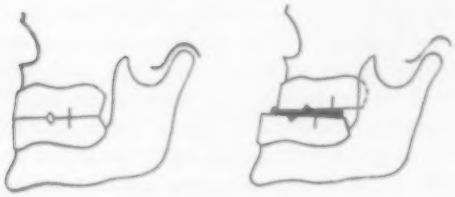

Fig. 1.—Christensen intraoral method of determining condyle path inclination

in each camp are a little nervous about the frailty of the reeds on which they lean. The confusion of the general reader is complete when he learns that in spite of Gysi's emphatic statement, literature accompanying the latest Gysi "Trubyte" articulator illustrates and recommends the method previously condemned.

Hall[8] questioned the validity of the intraoral method more specifically: "The customary registration of mandibular relations beyond the range of occlusion of the teeth is . . . delusive and wrong." He supported the statement with a diagram from Prothero (Fig. 2), showing two possible condyle registrations for the same person. He went on:

> The magnitude of a lateral movement of the mandible held within the range of the occlusion of the teeth . . . is so slight as to be practically immeasurable in the region of the condyles. Accurate reproduction of so slight a movement or relation in a mechanically adjustable articulator is impossible because the magnitude of the movement is not sufficie... direct the adjustment of the articulator g... Hence the time-old practice of registerin... cessive mandibular relations.

This challenging statement was made... teen years ago, but it produced hard... a ripple on prosthetic waters; or, if it ...d, the oil pourers, represented by the exponents of adjustable condylar guidan..., quickly minimized the disturbance. ...e only persons who welcomed it were t...se who thought it contained a justifica...n for their use of plain line articulato...

In a well reasoned article, Ow... stated that the inclination of the condyle path varies with the amount of protrusion, that the functional range is only about 3 mm. and that this range is too small for practical measurement. H...

Fig. 2.—Prothero's diagram of condylar guidance

break with traditional procedures was not, however, complete, for in the latter part of his article he described the use of a protrusive record of soft compound in some instances.

It will be apparent from this brief survey that most writers have been content to use and recommend the method on a mere assumption of its value; that some have raised doubts as to its accuracy without pursuing the matter to a conclusion, and that few, if any, have pre-

d experimental evidence by which usefulness of the method might be ly decided. On the whole there has a preoccupation with technic, with ns rather than ends.

here is substantial agreement on the m n objects to be achieved in building a prosthetic occlusion. The argument takes the following general form: Since mastication with natural teeth involves more than a mere crushing or chopping od and includes incision and lateral

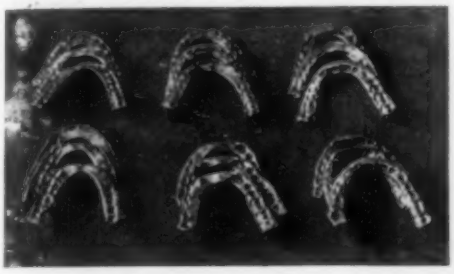

Fig. 3.—Wax records (in triplicate) of eccentric occlusal relations

chewing movements, any prosthetic occlusion developed on an articulator should be so arranged that the latter as well as the former movements are both possible and effective. Three reasons may be advanced in support of this view: 1. Such movements are natural, comfortable and habitual. 2. They can be demonstrated to increase greatly the efficiency of mastication. 3. Such an occlusion, by reducing leverage and displacing forces, conserves the health of the supporting structures, whether these be mucous membrane and bone, as in full and partial denture prosthesis, or periodontal membrane and alveolar bone, as in replacement with bridges or other forms of restorative work.

In recent years, the same considerations have led to the view that the successful treatment of periodontal conditions and the effectiveness and permanency of orthodontic treatment depend largely on so modifying or arranging natural teeth that there is finally produced an occlusion similar in many respects to that postulated as ideal for prosthetic occlusions. Prosthetists may derive some encouragement from the knowledge that their studies on the dynamics of occlusion over the last fifty years have now found such fruitful application in fields other than their own.

In examination of occlusion for periodontal and orthodontic purposes, it is agreed that the simple inspection of upper and lower casts which appear to be in centric occlusion while held in the hand not only is inadequate in many cases but may lead to positive errors in

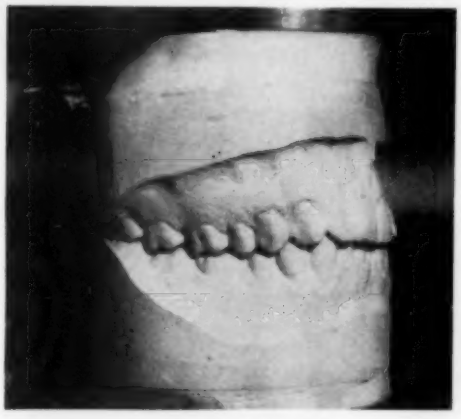

Fig. 4.—Casts of one subject, mounted in centric occlusion

diagnosis and treatment. Although the most reliable diagnosis is achieved by direct reference to the mouth, such a clinical approach alone is inconvenient for prolonged study and provides an imperfect view of the occlusion of the posterior teeth. If, then, an articulator must be used as a diagnostic aid, as seems unavoidable in a number of instances, the

problems reviewed in this study become important for several branches of dentistry in addition to prosthetics.

Method of Investigation

The subjects used in this study were 3 young adults with a full or almost full complement of natural teeth in normal arrangement. They were free from any symptoms of abnormality of the temporomandibular joint. Casts of each patient's jaws were mounted on an articulator by means of a centric record and face-bow transfer, and wax records of eccentric occlusal relations were secured in the following positions: incision unstrained (IU), incision strained (IS), maximum protrusion (MP), left lateral (LL), right lateral (RL), and 6 mm. protrusion (P6). Each of these 6 jaw relations was recorded in triplicate, making a total of 18 records of eccentric positions for each patient (Fig. 3). The type of occlusion studied and the roentgen technic employed are illustrated in Figures 4 and 5.[12]

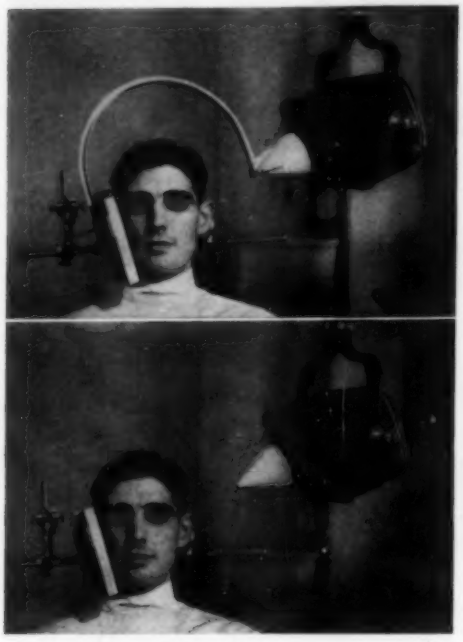

Fig. 5.—Lindblom apparatus for roentgen study of the temporomandibular joint

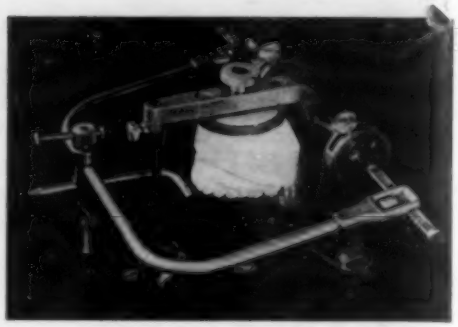

Fig. 6.—Face-bow transfer of upper cast to Hanau articulator

In the laboratory the condyle paths of the articulator were adjusted for inclination by means of each record in turn on two separate occasions. Further, the casts were transferred to a second articulator and the whole series of determinations was repeated. The articulators are illustrated in Figures 6, 7 and 8.

For each patient, roentgenograms were made of the left temporomandibular joint in strained and unstrained centric occlusion and in each of the positions previously recorded by intraoral wax bites. A typical roentgenogram is shown in Figure 9. Part of a series of tracings made from such roentgenograms is reproduced as Figure 10.

Roentgenographic outlines with added geometric construction were made by tracing the condyle and fossa in centric occlusion and superimposing on the result a tracing of the condyle in each of the 4 other jaw relations. A tangent drawn to the 2 condyle outlines gave the condyle path inclination (Fig. 11). The results provided convincing evidence

13. Lindblom, Gösta, Technique for Roentgen-Photographic Registration of the Different Condyle Positions in the Temporomandibular Joint. *D. Cosmos* 78:1227 (Dec.) 1936.

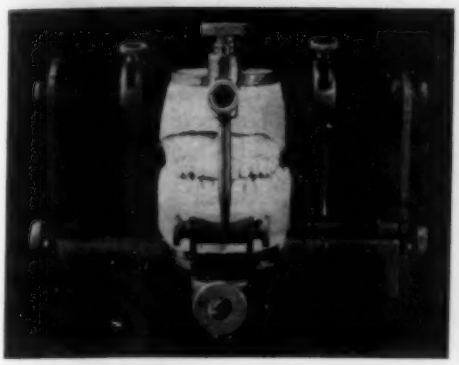

Fig. 7.—Casts mounted on Hanau kinescope

that the effective condyle path inclination varies considerably with the amount of protrusion.

A preliminary test of the reliability of the roentgenographic method was made by comparing tracings of duplicate roentgenograms of the same patient taken on different occasions (Fig. 12).

Analysis of Results

The results of this study will be accorded a mixed reception because, in brief, they show that wax intraoral records are so unreliable as to be practically worthless. Dentists who have never made individual condyle path adjustments by these means may be pleased to know that they have not denied their patients any essential service; practitioners who consistently employ such records and are blessed with the necessary mental flexibility may see fit to abandon their use with a wry smile; those to whom the conclusions of this study seem blasphemous and to whom the adjustment of condyle guides on an articulator is one of life's joys may continue to use the method secure in the knowledge that they are causing their patients no harm.

The original results of this investigation occupy several pages of tables which cannot be reproduced conveniently here. However, the general trend of the results may be stated briefly in this way: If three separate records of a protrusive jaw relation are secured and the condylar guidance on an articulator is adjusted according to them, they will yield three different results. A typical set of readings for 3 presumably identical records would be 20, 25 and 30 degrees. Similar variations will be found when sets of records are made at different times or even when the adjustment is attempted on different occasions with the same records.

For each subject used in this research 18 such records of eccentric jaw relations were made with the utmost care. When an attempt was made to hold the amount of protrusion constant, the range of readings obtained was similar to that already mentioned. When varying amounts of protrusion were incorporated in the records, a typical range for one subject was from 18 to 38 degrees for one side only.

A few related phenomena are worthy of mention. A lack of precise voluntary neuromuscular control by the patient was evident in the varying amounts of

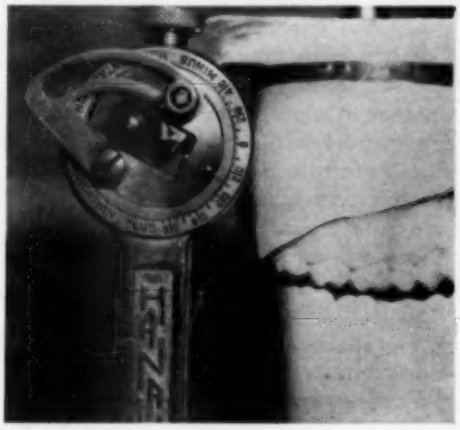

Fig. 8.—Translatory movement of the articulator condyle in extreme protrusion. Translation was measured in this location rather than at the incisors, where the actual forward movement is difficult to estimate

Fig. 9.—Roentgenogram of temporomandibular joint of the subject used in Figure 4, showing normal relation of the condyle to the glenoid fossa in centric occlusion. The reference line is parallel to the occlusal plane

protrusion achieved in response to a constant request to bite, for example, edge to edge. Such a request may produce a protrusion varying from 1.5 to 5 mm. Condyle path inclinations obtained on one articulator cannot be duplicated on another machine when casts and records are transferred in similar relation. This fact is not to be interpreted as invalidating the records as such, but rather represents the errors produced by slight differences in the flexibility of the machines and the amount of friction, clearance or wear in their moving parts.

The maximum observed translatory movement at the condyles was 7 mm. in direct protrusion, but the condylar translation necessary to bring the lower incisors into a position of functional incision in the 3 subjects examined was not more than 3 mm. The protrusion of 6 mm. suggested by most authors is thus invalid as an indication of jaw relations in incision, since it is far beyond the normal functional range. As might be expected, the inclination recorded varies with the amount of translation. This is inevitable, since the functional path is not straight except perhaps over a distance so small that practical measurement would be impossible.

It seems probable that the curvature of the path accounts, at least in part, for the fact that no two intraoral records made of the same patient by the same or different operators ever are identical. It is impossible to insure on each occasion that the degree of protrusion or lateral movement and hence of translation at the condyles will be the same, except by introducing further complication in the form of an incisal tracing in the horizontal plane, along which a fixed distance might be marked off after the method of Stansbery.[14] This, however, would eliminate only one of several sources of error. The most reliable series of records obtained gave a range of readings of 30 to 34 degrees for the left condyle and of 27 to 30 degrees for the right. This example may reasonably be taken as representing the utmost precision of which the method is capable. Unfortunately for the reliability of the method, it represents only 2 out of 30 determinations; and unfortunately for the validity of the method, it incorporates a protrusion beyond the functional range.

As for the roentgen findings, these must be interpreted with caution since it was not the primary or essential purpose of this investigation to establish the reliability of the roentgenographic method per se. As distinct from what is sometimes observed when the jaws are in rest position, the condyle in centric occlusion occupies approximately a symmetric position in the deepest part of

14. Stansbery, C. J., Functional Position Checkbite Technic. *J.A.D.A.* 16:491 (March) 1929.

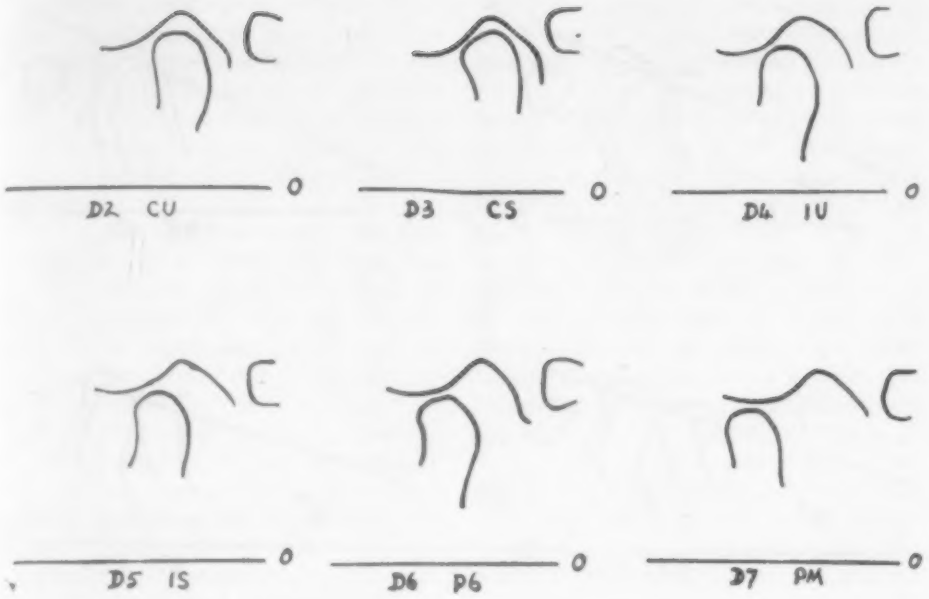

Fig. 10.—Roentgenographic tracings of the condyle and glenoid fossa

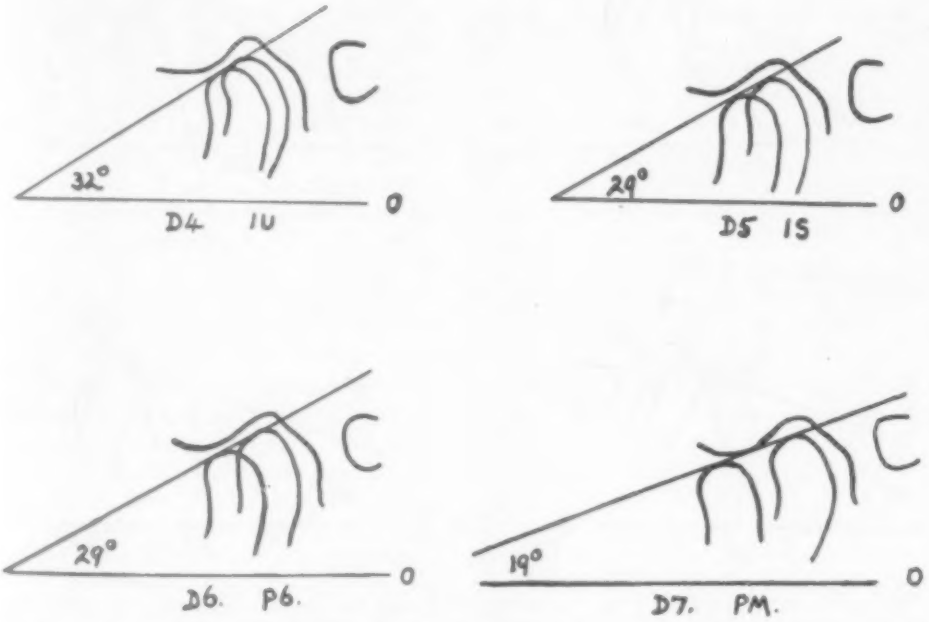

Fig. 11.—Superimposed tracings of condyle positions determined roentgenographically

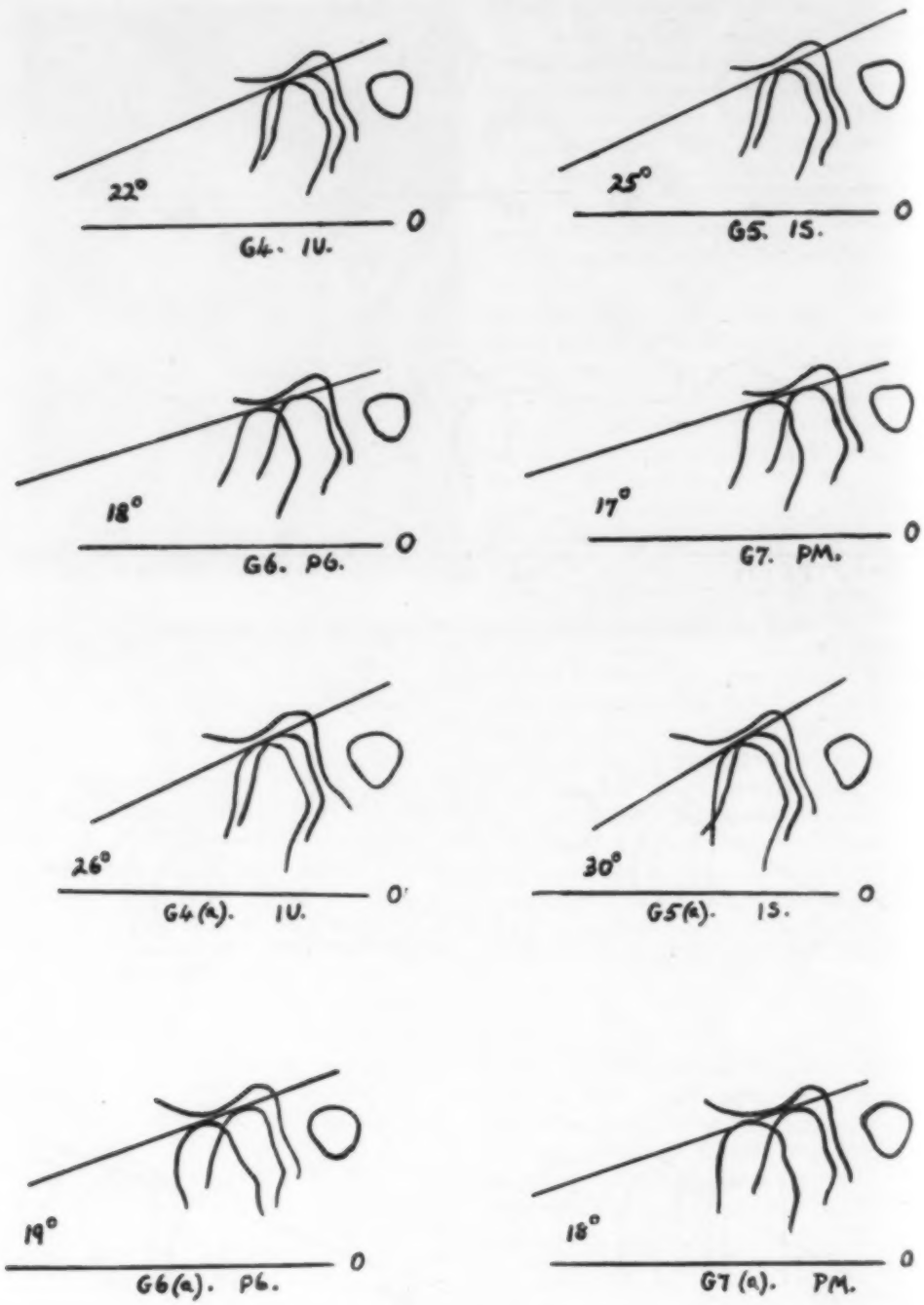

Fig. 12.—Superimposed tracings of condyle positions of one subject, illustrating the reliability of the roentgenographic method. The upper four sets of tracings were made on one occasion, and the lower four sets were made at a later date

the glenoid fossa. Also, the roentgenograms and the tracings made from them showed that in jaw movements with the teeth in contact the condyle maintains a reasonably constant distance of about 2 mm. from the articular surface of the glenoid fossa throughout a wide range of translation.

The possibility of producing identical roentgenograms of the temporomandibular joint already has been mentioned and illustrated in Figure 12. Roentgenograms of the same patient were made on different days, and the Lindblom apparatus[12] was dismantled and reassembled in the interval. Significant positive correlation (not in the statistical sense) between the two series is evident. It is probable that with slight refinements in technic, roentgenograms of the temporomandibular joint may be used to determine the shape and inclination of the functional condyle path. It does not follow, however, that any operation in dentistry necessitates such a measurement.

By means of superimposed tracings, variations in average inclination of the path again can be shown to depend on the amount of translatory movement. The fact that no correlation exists between roentgenographic and clinical determinations of condyle path inclination throws further doubt on the reliability of the latter. It was not found possible to demonstrate roentgenographically the compression or displacement of the interarticular disk in strained incision, although slight compression was evident in the original roentgenograms in 2 instances of strained centric occlusion. Assuming, as seems probable, that compression of the disk can occur in strained eccentric relations, it would, of course, contribute to the unreliability of records taken under pressure.

This analysis of the experimental results may be concluded by inquiring what are, in fact, the practical consequences of variations in condylar guidance. That these are much less important than is popularly supposed may be demonstrated as follows: If casts of natural teeth are mounted on an articulator in correct relation to the intercondylar axis by means of a face-bow, the precise effects of changes in condylar guidance on the occlusal relations of the molar teeth may be easily studied and measured. The second molars will be found to lie approximately halfway between the condyles and the incisors, when the distance is measured along the side of Bonwill's triangle. The second molars were selected for study because balancing contacts between them have long been considered important and because the influence of condylar guidance is clearly greatest in this region. This influence, it is well to remember, diminishes in teeth farther forward until, at the incisors, it is nonexistent. It is obvious that any change in the vertical position of the condyle will produce a corresponding change of only half its magnitude in the vertical relation of the molars.

For example, condylar guidance is set initially at 30 degrees, and the articulator is moved into such a protrusive relation that the incisors are in functional edge to edge contact. This will normally involve a translation or forward and downward movement of the condyle of 3 mm. measured along the 30 degree path. Except in the extremely rare instances in which occlusion is balanced, separation of upper and lower molars will be evident. If, now, condylar guidance is reduced to 20 degrees, it will be found that the molars move closer together by about 0.5 mm. In other words, at average settings, a change of 10 degrees in condylar guidance produces a change in the contact relations or cusp height of the second molars of only 0.5 mm. In lateral occlusion, a change of the same magnitude may be observed on the balancing side. There will, of course, be no appreciable effect on the working side. These phenomena are illustrated in exaggerated form in Figure 13.

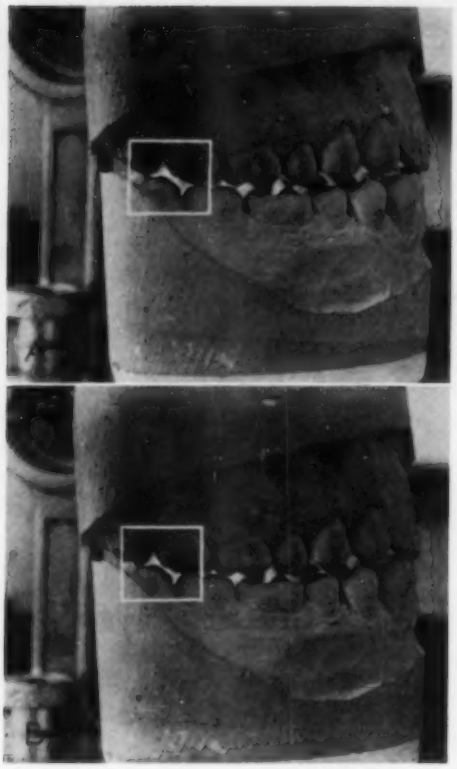

Fig. 13.—Relations of the molar teeth at same degree of protrusion but with different condylar guidance. In A, the condylar guidance was set at 40 degrees; in B, at 20 degrees. The relation between the distobuccal cusp of the upper second molar and the mesiobuccal cusp of the lower third molar has changed only slightly more than 0.5 mm.

What is the practical implication of this easily verified result? Generally, an average type articulator with condylar guidance fixed at 30 degrees can be used for all patients whose actual condylar guidance falls anywhere between 25 and 35 degrees, with a resulting error of 0.25 mm. or even less in the balancing contact of the molars.

It may be pointed out incidentally that if fixed condylar guidance is to be employed in practice, there is some justification for making it slightly steeper rather than flatter than the average of 30 degrees, for then the actual guidance of most patients will be flatter than that of the articulator. Under these circumstances, when the finished dentures are placed in the mouth and tested for eccentric occlusions, there will result a slightly heavy or premature contact of the molars, which may be corrected, if indeed it can be detected, by spot grinding of the balancing contacts of these teeth only. The reverse arrangement would necessitate grinding of the anterior teeth with a consequent alteration of esthetic values.

Conclusion

In studies of this kind, the use of numbers should not be allowed to give a spurious air of precision to results which are, in the main, qualitative. It is probable that such an elusive factor as condylar guidance would be more appropriately described and discussed in such terms as "steep," "moderate" and "somewhat flat," rather than in terms of degrees of angle. In this research the figures indicate the trend rather than the absolute magnitude of the various measurements. For some years the indiscriminate use of mathematical and geometric symbols in this field, coupled with an admiration for and a preoccupation with the undoubted precision of many articulators, has injected into professional thinking on condylar guidance a degree of precision which, fortunately perhaps, does not exist in fact.

Although this investigation has been deliberately limited to subjects with a full complement of natural teeth, the results have important implications for edentulous persons. It is impossible to conceive how a method which is unreliable and invalid when applied to natural teeth could be any more accurate when applied to full dentures. On the contrary, in the construction of full dentures relatively movable and unstable bases resting on a compressible founda-

tion of mucous membrane are substituted for the rigid and immovable teeth. This is true however well the bases may be adapted and whatever the method and material of their construction. The use of a central bearing screw, light recording pressures and plaster instead of wax will reduce the errors in records of edentulous jaw relations; but the residual errors will almost certainly be greater and can in no case be less than those observed in natural teeth and reported in this study. In other words, experimental application of the intraoral method to natural teeth has eliminated many variables and sources of error and has shown the procedure in the most favorable light possible.

To state the position once more in practical terms, if the condyle path inclination of an edentulous patient were known to be 30 degrees and teeth were set up in an adaptable articulator adjusted accordingly, the finished dentures would balance in the mouth. If, now, 2 additional sets of dentures were built with condylar settings of 25 degrees and 35 degrees respectively, they also would balance in the mouth. By purely clinical examination of the occlusion of the 3 dentures it would be impossible to distinguish them by any means likely to be employed by the conscientious general practitioner, for the reason that the magnitude of the actual discrepancy at the molars is so small as to be masked by factors such as tissue resiliency and salivary viscosity.

These considerations are advanced in support of the contention that the errors which average articulators may introduce are no greater and may even be less than those associated with fully adaptable machines adjusted by means of intraoral records; and since no time is required for their adjustment, one is encouraged to hope that in future they will be used in all fields of dentistry dealing with occlusion more often than they now are. But it would be wrong to conclude that any one type of articulator or associated clinical procedure may some day be universally employed. Complex articulator mechanisms will continue to fascinate dentists who delight in precision machinery and its manipulation. At the other extreme, it is true that at least some improvement in periodontal disease can be secured without occlusal diagnosis and equilibration, and that some natural malocclusions will respond to orthodontic treatment which contemplates nothing more than a locked or static occlusion. The truth lies somewhere between the chromium-plated triumph of engineering and the barn door hinge.

It is not for one moment disputed that workers who use individual measurements of condyle path inclination and adaptable articulators produce prosthetic occlusions of great accuracy. What is here denied is that such records contribute anything essential to the excellence of the result. The probable explanation is that dentists who bother to adopt such methods are equally meticulous in all other clinical and technical procedures, many of which are far more closely related to the production of good occlusion than the records to which in good faith they enthusiastically attribute their success.

Finally, the most that may be expected from continuous endeavors in this field is that it may be known more clearly than in the past precisely what is achieved by various means; that when a technic is advocated, its achievements in comparison with other methods can be explained clearly, and that in all technical procedures there will be a better and more economical adaptation of means to ends. Especially in studying the dynamics of occlusion is it to be hoped that orthodontists and periodontists will pay more heed than did the prosthetists to the fact that "A point is reached in all technical procedures, including that of making dentures, where the quest for further efficiency results in an elabora-

tion and complication out of all proportion to the gain secured.[15]

Summary

1. This report is a critical evaluation of a series of 54 consecutive wax records of jaw relations and 240 articulator adjustments of condyle path inclination made according to them.

2. To supplement this evidence, 25 roentgenograms of the temporomandibular joint were examined. These depicted the relation of the condyle to the articular surface of the glenoid fossa in the positions shown on the intraoral records.

3. The use of intraoral wax records of eccentric jaw relations for the adjustment of horizontal condylar guidance on anatomic articulators has been shown to be invalid and unreliable.

4. Roentgen evidence is presented of various phenomena associated with normal temporomandibular joint function, and the possibility of determining condyle path inclination by roentgenographic means has been tentatively established.

15. Craddock, F. W., *Prosthetic Dentistry: A Clinical Outline*. London: Henry Kimpton, 1945.

THE FIELD OF RESEARCH IN DENTISTRY

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THE investigation of the problems of dentistry affords an attractive life work to those who by temperament and preparation are qualified to pursue it. The number of those who engage in dental research as a life work is small, as in other fields of medical health service, while the need is great. Usually the research worker in the health field differs markedly in temperament and objectives from the practitioner. He is less concerned with the high financial rewards that often come from private practice, but is actuated, rather, by an insatiable curiosity and a consuming desire to add to the sum total of human knowledge. He is not content merely to put into practical application the knowledge and technics he has acquired in school and from other sources. During the course of his professional training he has been impressed too often with the definite limitations of knowledge in his profession and has felt the urge to do something about it. If he is fortunate and the opportunity presents itself, he devotes his life and energies to pushing back the frontiers of knowledge and to helping to solve some of the problems of public health.

The beginning researcher must first prepare himself by learning all that is known in a specific field and must familiarize himself with the fundamental sciences that underlie a particular problem. Then, in due time, he is ready to undertake his own investigations and to

This article was written at the request of the Research Committee of the American College of Dentists.

Dean, School of Dentistry, University of Michigan.

follow his own devices in the planning of his studies.

The life of the research worker is interesting. It is marked by great challenges and intriguing situations. New lines of endeavor open to him as, step by step, he follows what seems to him to be the most logical approach. In this he should be afforded absolute independence and freedom of action. The research worker should not punch a time clock, nor should he follow the stereotyped schedule required in private practice. He should be free to follow his own inclinations and should not be compelled to conform to any predetermined pattern.

Yet his life is strenuous. The successful researcher must eat and sleep with his problem. His every waking moment is consciously or unconsciously occupied in the train of thought that he is pursuing. In a conversation on the subject of concentration in research, Charles Kettering said, "I often get a 'charley horse' when working on a problem." Day after day the problem unfolds. Often clues are followed that prove to be false or, indeed, may lead to concepts that were totally unexpected. Many of the greatest contributions have been by-products of studies aimed at quite different objectives. The bacterial hypothesis of disease was evolved by Pasteur in the search for the reasons why the wines of the vineyards of France frequently were spoiled. The discovery of penicillin by Fleming came from the study of the nature of contaminants of bacterial cultures.

Among the rewards of research comes the thrill of new experiences and of meeting new situations. There is no danger of boredom, which often comes from long years of close confinement to dental practice. Furthermore, there are great satisfactions from the consciousness that one is treading new ground and following paths that hitherto the foot of man has never touched. Especially is this true when there is a realization that progress has been made toward the solution of some problem that is important to human life and welfare. The satisfactions that come from the realization that one has played an important part in some investigation which has proved to be a boon to mankind cannot be measured by financial rewards or other commodities of life.

The research worker enjoys greater freedom than does anyone else in society. He must be free, or he cannot carry on true research. He should be under no directional influence or compulsion other than his own consuming passion to solve the problems at hand. He should be supported and protected, free from immediate financial stress and unhampered by extraneous interference. In his laboratory he should reign supreme as an autonomous agent of the growth and development of knowledge for the benefit of society. As such, he is respected and, if successful, often revered and honored for his contributions to society.

Development of Dental Research

Research in dentistry has been carried on for the most part by dentists. A few nondentists, who have had training in the allied fields of bacteriology, physics or chemistry, have become interested in the problems of dentistry and have made important contributions. Little has been done by those who have had medical training. Medical research has been directed to problems in other fields of medical science, and little attention has been given to dentistry.

In the beginning, dental research was done by individual practitioners and manufacturers of dental materials who were keen observers and were able to record significant facts in clinical practice and in the laboratory. Later, in the development of biologic studies in dentistry, there were two outstanding personalities who, working alone, made notable contributions to dental science which remain as permanent achieve-

ments. One of these was Willoughby D. Miller, an American who lived and worked in Germany in the latter part of the nineteenth century. The other was G. Vardiman Black, a former dean of the Northwestern University School of Dentistry, who carried on extensive researches during the same period. These two pioneers in dental science laid the foundation for modern research in dentistry, on which a considerable number of recent studies have been based. In their day the means for scientific approach were meager, and their possibilities were, therefore, distinctly limited. Today, with the facilities available and the vast amount of contemporary scientific knowledge at hand, it is possible to attack the problems of dentistry in a more direct and positive manner. Dental research at the present time is making great strides toward the solution of its most pressing problems, as is evidenced by the activities of the International Association for Dental Research, an organization of research workers and those who are vitally interested in dental investigation, which now has more than 500 members.

Types of Research Activity

There are two general types of research activity in dentistry: one, conducted by individual investigators working alone in private laboratories or independently in dental schools or commercial laboratories; the other, pursued by groups of associated workers in the same or differing fields of inquiry.

The first type includes the work of many teachers in dental schools, who devote a part of their time to teaching and the remainder to their laboratory studies. In such situations the research worker has the advantages of clinical experience, collaboration with other teachers in the school, contacts with those engaged in allied fields of study in other departments of the university and access to large and well equipped libraries. Such contacts are most valuable, but the solitary worker, isolated from close institutional relations, is under a distinct disadvantage and seldom is highy successful.

The other type of research activity in dentistry is to be found in various foundations for research, where groups of workers study specific problems either separately or conjointly. Examples of such group research are to be seen in the Zoller Clinic of the University of Chicago, the Rochester School of Medicine and Dentistry, in Rochester, N. Y., the National Institute of Health, in Bethesda, Md., and the National Bureau of Standards, in Washington. Each of these groups has splendid library facilities, and full cooperation for mutual benefit exists among the various members. From such group studies many valuable contributions have been made to dental science.

Fields for Study

What are the unsolved problems of dentistry? The most outstanding problem, which today is of the greatest concern, is decay of the teeth. This disease, which affects 95 per cent of the American people, is the greatest single factor in dental practice and dental health service. More than 75 per cent of all dental practice is concerned, primarily or secondarily, with dental caries. Thus far it has been combated almost solely by the repair of dental lesions, in which 70,000 dentists can care for only a minority of the American people.

Many studies of caries are now in progress, and some headway is being made in the quest for practicable means of controlling and reducing the incidence of this dental disease. If an adequate and effective control method were discovered, the entire scope of dental practice would be changed. More persons would keep their teeth throughout life and be saved from the inconvenience of wearing arti-

ficial dentures and from inadequate mastication. Thousands would be protected from the pain of diseased and aching teeth, and thousands would be kept from the serious systemic infections which often result from dental disease. Even a partial, but substantial, reduction of the attack rate of dental caries would have profound economic, social and health effects, the significance of which would be immeasurable. This is a great challenge to dental research workers.

In the field of periodontal diseases, there are many unsolved problems. Large numbers of persons are suffering from periodontal degenerations with attendant infections which, all too often, affect the general health. Little is known of the general systemic factors which underlie and predispose to these diseases and of means for their correction. The significance of these periodontal disturbances and the need for their control in the interests of oral and general health are becoming more and more apparent. Considerable study is now being directed toward a better understanding of periodontal disease and the improvement of the present means of its control. This, too, is a major problem in dental health service.

In the field of orthodontics, thousands of children are going through life as dental cripples because of serious malocclusion of the teeth. There are not enough orthodontists to care for them all, and, if there were, serious economic factors would interfere with any plan for universal service. What is needed is development of practical preventive measures that may be made available to children everywhere. This involves factors of heredity, growth, habits and diet, as well as the development of minor corrective measures, all of which require much study.

In the field of dental materials, much remains unknown about the behavior of the various materials in daily use in dental practice. In the National Bureau of Standards, in the laboratories of many manufacturers of dental materials and in some dental schools investigations are being made on certain of their properties, but much more needs to be done to perfect professional knowledge of the materials and to facilitate their use. In fact, the perfect dental filling material has not yet been discovered. It is reasonable to expect that some day a new material will be found which may greatly reduce the time required in filling teeth and which will be more satisfactory than any now available.

The bacteria of the mouth have never been fully studied or classified, and the mechanism which controls their growth or overgrowth is not understood. It is suspected that oral bacteria and their toxins gain entrance to the body to produce far-reaching and serious systemic disturbances, but there are few factual data at hand in regard to oral focal infection. It is highly desirable that dentists know when a tooth is safe and when it is harmful to the body as a whole. At the present time, there is no accurate method of determining these facts. This complex problem needs study from the bacteriologic, serologic, histologic, and dental and medical clinical aspects. Improved understanding of this question would have a profound effect on dental and medical clinical procedures and would constitute a distinct contribution to public health.

Opportunities in Research

These and many other unsolved problems in the dental field constitute the unexplored areas of professional knowledge in which competent research workers are needed. So important are these questions to the health of the people that appropriations are being made by the government and by foundations to support investigations in these several fields. Recently Congress made a substantial appropriation for dental research.

Money, however, will not solve the

problems. Research cannot be bought as a commodity on the market. Research is individual. It springs from the hearts and minds of those who have a desire to pioneer and delve in unknown fields for the benefit of mankind. Those who have that desire should know that there are great opportunities in this field and that adequate financial support is available for those who are competent and who desire to spend their lives in the study of the unsolved problems of dentistry.

How can one become a research worker? The first requirement is that he choose some problem in which he is interested. It may be in dental caries, periodontal pathology, oral hygiene, orthodontics, prosthodontics, dental materials or some other field of inquiry. This choice may well be made during student days, and the beginnings in research should precede the engagement in dental practice, with all its involving complications.

On graduation, those who are interested in research have several courses open to them. One is to enroll in some university for a graduate degree in preparation for the specific study contemplated. This will require one or two years of study. Fellowships for the support of graduate students are offered by various foundations, by some universities and by the United States Public Health Service.

In dental schools, the research worker who has won his Master of Science degree is eligible for teaching-research positions, which are now being offered, or he may obtain a full time research appointment either in a school or in one of the research centers, where he will be maintained on a salary which should increase with years of service and advancement in his study. If he is competent and industrious, he will grow in his field until he becomes known as an authority on his subject and has made notable contributions to what is known about it. Those who have won recognition in research are greatly in demand as teachers in dental schools and as heads of major research projects.

Such research careers offer much to young graduates and should be seriously considered by all who are interested in the sciences of their profession.

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Consider the Bone, Too.—The pattern of behavior of the soft tissue is conditioned by the hard tissues with which it is in contact. That is not to say that bone is such a rigid tissue that it will never round out its jagged edges or thin out its blunt margins. That is not the case. These changes are so slow, however, that the soft tissue overlying such bone will degenerate and become pathologic long before the changes can take place. It is for this reason that we must treat the problem clinically as if the bony form were permanent or nearly so. Heretofore, we have contented ourselves with soft tissue surgery with minor or inconsequential attention to the bone limited to the reduction of spicules. Many of us have watched the steady regrowth of tissue in some cases so that the depth of the gingival sulcus grew deeper than we would have had it. Too many compromises have been made with the end result. It is granted that much of this tissue looked and behaved as healthy tissue looks and behaves, but the same result may be achieved by skillful curettage without resort to surgery. The only reason for surgical management of a given case is the certainty of the elimination of the pocket.—*Saul Schluger, "Osseous Resection—A Basic Principle in Periodontal Surgery," Oral Surg., Oral Med. and Oral Path. 2:316, March 1949.*

TEMPERATURE AND HUMIDITY CONTROL WITH SILICATE CEMENT RESTORATIONS

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This study deals with control of temperature and humidity in the operating room as an aid to more permanent silicate cement restorations. If these two elements are controlled, a cold mixing slab can be used in any weather. Adequate control is possible under the most adverse atmospheric conditions by use of dry heat in cold weather; combined heat, cooling and dehumidification in intermediate and damp weather, and cooling and dehumidification in hot weather. The summer season produces the most adverse conditions of heat and humidity.

This is not a complete treatise on silicate cements, the nature and use of which have been thoroughly covered by others. It is simply a study of the relation of temperature and humidity to these substances.

Mixing-slab temperatures below 75 F. are not usable in 90 degree weather in humid climates. With air conditioning, however, slab temperatures of 50 to 55 F. are possible in summer heat. Room temperature and relative humidity are reduced, thus lowering the dew point and allowing the use of a cold slab without condensation of moisture on its surface.

Changes are constantly taking place in temperature, pressure and humidity or water content of the air. There are many sources of water vapor in the air, including decaying plants and the breath of animals and human beings, but by far the greatest sources are bodies of water, moist earth and growing vegetation. Heat is required for evaporation, and in general the greater the amount of heat the more rapid the evaporation. It is, therefore, to be expected that the warmer the climate, the greater the humidity, if the area provides these sources of vapor.

Relative humidity is the ratio between the amount of water a unit volume of air actually holds and the amount it would hold if it were saturated. Heretofore, hot humid climates, coastal areas and shipboard presented great obstacles to successful silicate manipulation, but with modern air conditioning this is no longer true. A very important factor in permanence of silicate cement restorations, that of increased powder content in the mortar, is made possible in summer or winter by air conditioning. An unbroken procedure in removing moisture, the arch enemy of silicate cement, can now be followed from the moment the powder and liquid are unstoppered until the mix has set within the cavity and all danger from moisture is over. We can't all practice in a dry, cool climate, so if a scientific technic is applied to silicates it must begin with the very atmosphere in which we operate.

Controlling Humidity

There are three sources of moisture to control: saliva, saturated breath and humidity. The first two are controlled with the rubber dam and the third by air conditioning. Summer conditioning is accomplished with a self contained room conditioner that is water cooled and allows for repeated excursions of room air through the conditioner. It is necessary repeatedly to draw the operating

room air through the conditioner in order to reduce the humidity to the lowest possible figure. In spring and fall when the weather is damp and the temperature ranges in the seventies, I have found it necessary to use both heat and cooling to reduce the relative humidity of the operating room. The cooling unit has an automatic cut-off which operates when the room temperature goes below 70 F. On many fall, winter and spring days it is necessary to use heat to keep the unit in operation and the operating room at a comfortable temperature, preferably between 72 and 74 F.

A hygrometer is used to calculate the relative humidity of the atmosphere. It consists of two ordinary room temperature thermometers mounted on a wooden panel with insulating supports and a siphon reservoir. A wick runs from the water-filled reservoir to one of the thermometers. Evaporation of the water from the wick produces cooling, thus reducing the reading of this thermometer. The relative humidity is computed from the difference between the dry and wet bulbs, by use of relative humidity tables. It is subject to change in a very few minutes, and consequently must be computed immediately before it is needed to figure the dew point. For correct readings the hygrometer must have a fan directed on it until the readings become stationary, and care must be taken not to breathe on the hygrometer or come too close to it.

Table 1.—Hygrometric table for obtaining the dew point (from Jameson[1])

Dry bulb reading (degrees Fahrenheit)	Factor
70	1.77
71	1.76
72	1.75
73	1.74
74	1.73
75	1.72
76	1.71
77	1.70
78	1.69
79	1.69
80	1.68
81	1.68
82	1.67
83	1.67
84	1.66

Calculating the Dew Point

This hygrometer is not designed to register the dew point in a semi-automatic manner, so it is necessary to compute the dew point with the help of tables. The simplest method is to use the "Greenwich Factors," which were originally laid out by James Glaisher of London. To arrive at the dew point, carefully read the wet and dry bulbs. The difference between them is multiplied by the factor corresponding to the dry bulb reading given in the hygrometric table prepared by Jameson[1] (Table 1). The product must then be subtracted from the dry bulb reading, and the result is the dew point.

For example: If the dry bulb reading is 70 degrees and the wet bulb reading 60 degrees, the difference is 10. The factor for 70 degrees is 1.77; therefore, multiply 1.77 by 10 and the product is 17.70. Now deduct this amount from the dry bulb reading, 70 degrees, to get the dew point, 52.3 degrees.

Examples

Table 2 gives typical examples of temperature, humidity and dew point in this area in the summer. Table 3 illustrates the effect of air conditioning. The first group of temperature readings in Table 3 was recorded as the patient was seated in the operating chair, and at this time the air conditioner was turned on. The second readings were made 15 minutes later, and the third immediately before

1. Jameson, P. R., *Weather and Weather Instruments for the Amateur*. Rochester, N.Y.: Taylor Instruments Co.

preparing the slab. In this instance, the room temperature dropped 8 degrees, relative humidity 21 points, and dew point 17.05 degrees. Although the drop in temperature was great and helped to lower the dew point, the drop in relative humidity had a greater effect on the dew point.

The first group of readings was made merely to show the need for air conditioning. This was not an exceptionally hot day, but the relative humidity was rather high and it would not have been possible to have used with safety a slab temperature under 69 F. Had the room temperature been 6 degrees higher with the same difference between the wet and dry bulbs, it would have been necessary to use a 75.5 degree slab, as moisture would have collected on the slab at a temperature slightly below this. Data like these, and even higher temperatures and humidity, are common in this area after a summer shower. In a southern climate in summer it is rarely possible to use a slab temperature below 70 degrees without some method of temperature and humidity control.

The second group of readings was made to anticipate the approximate usable slab temperature. For safety, I always use a slab temperature one or two degrees above the dew point, but since in this case the dew point was dropping, I estimated the slab temperature at 52 F. Ice water was prepared and kept at this temperature, and a thermometer and two flat-sided glass bottles, used as slabs, were placed in the ice water. This was not done in the operating room, as no evaporation should take place there.

The third group of readings was timed to produce a slab for the mix when all was ready at the chair. Ice water at 52 F., or approximately one degree above the dew point, was placed in the bottle, which was dried and carried to the operating room wrapped in a dry towel.

As an example of the use of heat and cooling to reduce humidity and the dew point, the following observations were recorded from an actual case.

Table 2.—Data obtained without air conditioning on consecutive cloudy, humid August days

Dry bulb, °F.	Wet bulb, °F.	Relative humidity, per cent	Dew point, °F.
85	77	70	71.80
80	73	72	68.24
75	70	78	66.40
78	74	83	71.24
76	73	87	70.87
86	73	57	64.50

At 8:30 a.m., when the patient was seated, the dry bulb reading was 78 degrees, wet bulb reading 70 degrees, relative humidity 67 per cent and dew point 64.48 degrees. The cooling unit and electric heater were turned on, and twenty minutes later the dry bulb reading was 77 degrees, wet bulb 63 degrees, relative humidity 45 per cent and dew point 53.20 degrees. A 55 degree slab was used.

More startling results can be obtained in a longer period of time, but in actual practice the time element must always be considered. In this instance there was only a one degree drop in temperature but a drop of 22 points in the relative humidity, resulting in a drop of 11.28 degrees in the dew point. Reduction of the water content of the air is here almost wholly responsible for the lowered dew point.

First Observations

My first observations of room temperatures and slab temperatures were made early in the spring of 1943. W. Clyde Davis had given a clinic on silicate cements that seemed wonderful in comparison with my success at that time. Of course, it wasn't long before I discovered that the climates of Alabama and Nebraska were as different as day and night. What would work in a semi-arid climate would not work in a hot, humid climate.

I had incompletely air conditioned my office in 1936 and, of course, had noted some relief in handling silicates and cements.

Later I procured my first hygrometer and began to observe humidity in relation to room temperature and slab temperature. Humidity continued to be the real problem as the seasons rolled around. Records were kept of the operating room temperature and the lowest slab temperature that could be used without condensation of moisture. I found that directly over the grill of the air conditioner a slab could be used 5 degrees colder than on the cabinet. Soon the error of this procedure suggested itself. Silicate at a temperature below the dew point of the room would surely cause moisture condensation when inserted into the cavity. I wanted to use a slab no warmer than 55 F., but it became apparent that in order to do this I had to reduce still further the room temperature and humidity. This was accomplished by removing the sterilizer, which produced both heat and vapor, using fluorescent lighting overhead and improving room insulation. From these early observations, before I learned to compute the dew point, a chart was prepared to aid in anticipating the approximate usable slab temperature. Later I learned the method of accurately computing the dew point and all guesswork ceased. Since then my efforts have been directed toward improving my technic of manipulating the materials. I found that a 50 to 55 F. slab produced a dense enough silicate cement filling. Also that an electric vibrator designed for amalgam condensation was the ideal instrument for silicate condensation. Plastic points of two sizes were obtained for this instrument. Density is obtained by patting the mix on the slab and using vibrating force in insertion.

Table 3.—Typical effects of air conditioning on relative humidity and dew point

Group	Dry bulb, °F.	Wet bulb, °F.	Relative humidity, per cent	Dew point, °F.
1	84	74	62	67.40
2	78	64	46	54.34
3	76	61	41	50.35

Use of Vibrating Force

Nowhere in dental literature have I found any information to help me in this study of temperature and humidity control. Some writers have pointed out the desirability of using a cold slab but suggested no method of avoiding condensation of moisture. All authorities seem to agree that a dense mix is desirable. Air conditioning is the answer to the problem. The first step to more permanent silicate cements, that of increased powder content, is made possible by this product of modern science.

Vibrating force is ideal for carrying this denser mortar from the slab to the cavity and condensing it. Malleting has been tried and discarded. The reasons I believe vibration to be superior to malleting are these:

1. Vibration brings the liquid in the mortar to the surface, causing it to adhere to the point and keeping it in a plastic state.

2. It continues to do this as it condenses the silicate cement in the cavity.

3. This force will not fracture delicate enamel margins.

4. One point on the vibrator is sufficient to complete the entire operation, eliminating loss of time in changing points and instruments.

It is essential to overfill the cavity so that the liquid vibrated to the surface is well above the margins. In amalgam condensation, excess amalgam is always inserted, vibration causing the excess mercury to rise to the surface. This portion is then carved off, leaving the denser amalgam beneath. The same technic is

used with silicate fillings in order to leave a dense mass over the margins. Finishing is, of course, more difficult, but it is easily done with sharp files and diamond stones well lubricated which cause no appreciable heat. Speed is essential, as placement of the filling must be completed while the silicate is entirely plastic. It must be strongly emphasized that without the vibrating force this drier mortar cannot be placed in the cavity, for with it we attain speed and keep the mortar in a plastic state. I am using Gottlieb's zinc chloride-potassium ferrocyanide impregnation treatment[2] and believe it to be the answer to pulpal irritation under silicate cements. Vibration also reduces the amount of phosphoric acid in contact with dentin.

Procedure

At the beginning of an operation for the insertion of silicate cements, the operating room is closed, for the temperature and relative humidity must be reduced as much as possible. Repeated excursions of the room air over the cold coils of the unit continue to precipitate moisture. The temperature and relative humidity are reduced, lowering the dew point below 55 F. For best results slab temperatures above 55 F. should never be used. Much lower temperatures can be obtained in winter than in summer; however, slab temperatures slightly below 55 F. are satisfactory and the results are far superior to those obtained with slabs at 65 to 75 F. as recommended by manufacturers of silicate cements.

The rubber dam is absolutely indispensable and no degree of permanence can be obtained without its use. To allow saliva to come in contact with the silicate at the gingival margin or the moisture-saturated breath to come in contact with the cold silicate is to invite failure. Even the operator's breath should be guarded and one finger can be placed beneath the patient's nose to deflect his breath.

The shade is obtained before the rubber dam is placed, and the powder portions are measured and placed in paper containers marked for identification. All blending is done on the paper before it is folded to protect the powder from long exposure to the air.

Correct slab temperature is estimated and ice water at this temperature is prepared in a pan large enough to hold two flat-sided glass bottles and a thermometer. The bottles are stoppered and left in the ice water while the cavity is being prepared. On completion of the cavity the dew point is calculated. Water one degree above this figure is poured into one of the bottles, to bring it to the correct temperature while a steel matrix is being applied to the tooth. A steel matrix is used for strength and is held in place with compound. It is not pulled over the inserted silicate, as this would tend to displace it and disturb gelation. The slab is dried, wrapped in a dry towel and brought into the operating room. The towel is removed and the slab is wiped with a dry tissue and observed for a few seconds for condensation of moisture.

The powder is now placed on the bottle slab and segmented, and the liquid is dropped. Spatulation is begun immediately. The goal is a drier mix, but care must be taken not to get it too dry. At no time should liquid be absent from the surface of the mortar. It is kept there by hammering the mortar with the spatula as described by Davis.[3, 4] The mortar is kept in a rather small area. Approximately one third of the powder is incorporated at the beginning, and additional portions are progressively smaller.

As long as the mortar is decidedly plastic it is worked by small circular

2. Gottlieb, Bernhard, *Dental Caries*. Philadelphia: Lea and Febiger, 1947, pp. 186 and 223.

3. Davis, W. C., *Clinical Operative Dentistry and Therapeutics*. Lincoln, Neb.: Author, 1939, chap. 26.

4. Davis, W. C., *Operative Dentistry*, ed. 3. St. Louis: C. V. Mosby Co., 1945, chap. 27.

strokes, but as the mass becomes more dense it is piled in an area about the size of a nickel and additional small portions are pulled over it and hammered in, this hammering action continually bringing the liquid to the surface. When the mortar ceases to spread with this hammering and continues to hug the slab in the prescribed area, it is close to the desired density. From here on additions of powder depend entirely on the temperature of the slab.

The mortar is now covered with a cold dappen dish and inserted immediately before gelation begins. Approximately 20 per cent more powder can be incorporated into a mass of mortar with a slab temperature of 55 F., 30 per cent more at 50 F., and 35 per cent more at 40 F. than could be incorporated using the manufacturer's directions for spatulation and slab temperature.

The vibrator, which has been kept cold by allowing it to stay over the grill of the cooling unit, is now turned on and a portion of the mix is picked up as the assistant lifts the dappen dish. Additional portions are added, filling the cavity to excess and using pressure with each addition. The vibrating force causes the mortar to flow into the cavity, condenses it and keeps the surface of the inserted silicate continually moist. Hand insertion of this dense mortar is absolutely impossible as it crumbles and will not adhere. When the margins are well covered, cocoa butter is applied immediately. After the initial set the steel matrix is loosened and more cocoa butter is applied.

The filling is not disturbed for 30 minutes. Then excess filling material is removed with files and slow-running diamond stones, well lubricated. Only the bulky excess is removed to free the occlusion and relieve unnecessary roughness. Finishing is completed at a subsequent sitting. The patient leaves with excess cocoa butter removed and varnish freely applied to the surface of the filling, and he is instructed not to rub it off for at least two hours.

I have found it necessary to place the silicate liquid and all instruments used in this operation over the grill of the cooling unit. In this way the temperature of the mortar is kept as low as possible. Of course, care should be taken to ascertain the grill temperature, for if that temperature is below the dew point of the room, moisture would collect on the instruments.

I have also found that too-rapid mixing causes faster setting; therefore, smaller portions of powder are incorporated at one time than is usually recommended by some operators. Unless the slab temperature used is well below 48 F., only one filling should be attempted with each mix. I have made it a rule to attempt only one insertion, as it is impossible to do more in this climate except on the most ideal days during the winter.

Summary

More permanent silicate cements are as possible on the equator as in a cool, dry climate if operating room temperature and humidity are controlled. It is hoped that application of these principles to manipulation of silicate cement will be of increasing interest to the dental profession. Years of practice have demonstrated that this branch of operative dentistry does not have to excuse itself with a four or five year result, but can promise its recipients a period of service directly in proportion to the operator's adherence to these principles of silicate manipulation.

All authorities have agreed on one main principle for increasing the strength of silicate cements, that of increasing the powder content of the mix. This is possible only on a cold slab. Heretofore, no solution has been offered as to how a cold slab can be used all year in any climate. This is accomplished in summer

by air conditioning. With outdoor temperatures in the nineties, slab temperatures of 55 F. and lower can be used without condensation of moisture on the surface of the slab. In winter, conditioning is done with dry heat, the relative humidity being reduced in direct proportion to the amount of heat used.

Temperature and humidity control is a new and most interesting study when applied to silicates. It is within the reach of every dentist who wishes to improve his silicate cement restorations.

It is a great aid in all cementing operations, and last but not least the temperature of the operator is kept normal, which is no little aid to successful operation.

DENTAL SERVICES OF THE CHILDREN'S BUREAU

John T. Fulton, D.D.S., Washington, D. C.

THE Children's Bureau, Federal Security Agency, serves as a center for the working out of standards of care and protection that will give to every child in the United States his fair chance in the world. Its programs, therefore, consider the physical and mental health of children and youth and the social and economic factors affecting their well-being.

Dental problems, intruding as they do into all these phases of child life, occupy an important position in the action programs of the Children's Bureau.

In dealing with children's needs, the bureau associates with parents, professional workers and public and private agencies that serve children and youth. Cooperative endeavors include the interchange of information, advice, consultation, the objective working out of standards and financial assistance through federal grants-in-aid.

Such services to dentistry are extensive and important. The standing advisory committee of the Children's Bureau includes dentists selected with the advice and consultation of the American Dental Association. In addition, the bureau, with great benefit, has used two technical dental advisory committees for guidance and consultation. These committees, one on pedodontics and public health, the other on orthodontics, were made up entirely of outstanding dentists in these fields.

Out of conferences with these committees grew two important sets of standards, which define the dental services necessary for development of healthy children. These standards are available for distribution. Other dental studies, made by bureau staff members on such subjects as children's dental needs, distribution of services and content of dental programs, likewise are available.

A new service, begun this year by the Children's Bureau, is the operation of a clearing house wherein current research in child life is cataloged and abstracted for the use of research workers. Den-

Dental Services Adviser, Children's Bureau, Social Security Administration, Federal Security Agency.

tistry for children will be among the subjects covered in this clearing house, and its services will be available to dentists engaged in research.

Financing the Program

Financial assistance for dental programs from the Children's Bureau is made up entirely of grants-in-aid to official state agencies for maternal and child health and crippled children's services. Funds made available under Title V, parts 1 and 2, of the Social Security Act are granted to the state to carry out a plan submitted by the state agency for approval. The content, scope and emphasis of the program are matters strictly for state determination. It was not until money became available under this act that dental divisions were established in the majority of state health departments.

From the beginning, dental activities in state health departments have been financed largely by maternal and child health funds. A study of dental programs covering nine years revealed that about 10 per cent of the grant-in-aid money for maternal and child health has been used by states for dental programs.[1] The budgets of 48 health departments of the states and territories for the fiscal year ending June 30, 1949, carried about 1.75 million dollars for their divisions of dentistry. Fifty-one per cent of this sum came from federal maternal and child health funds; 39 per cent was listed as state and local money, and the remainder came from other sources.

Although the content of dental programs is determined by the state, the Children's Bureau furnishes consultation when requested to do so and encourages children's dentistry of high quality and comprehensiveness.

The funds are budgeted in varying amounts for dental health education, research, dental care and training. Salaries, travel, equipment, supplies, educational materials and fees for services of practicing dentists are included in items of expenditure. Two water fluorination projects and several state topical fluoride programs have been financed by these funds.

Postgraduate Training

One of the most fruitful uses to which maternal and child health funds have been put is the postgraduate training of dentists. Many states have conducted refresher courses in children's dentistry. Some have provided stipends for dentists to attend short courses at universities. Others have made it possible for dentists to obtain public health degrees.

In the last two years, eight states, by the use of special maternal and child health funds, have aided universities in strengthening their graduate teaching facilities in pedodontics or have inaugurated comprehensive service programs of national significance.

Crippled children's funds granted by the Children's Bureau are not so widely used as maternal and child health funds in state programs for dentistry, except in providing orthodontic care for children with cleft palate. One state is now using special crippled children's funds to develop at the state university a center for graduate training in the team approach to the problem of rehabilitation of children with cleft palate. The dental school will play an integral part in this training.

1. Fulton, J. T., Budgets and Expenditures for Dentistry from Maternal and Child Health Funds. *Am. J. Pub. Health* 38:825 (June) 1948.

DENTAL CARIES DATA OBTAINED BY SIMPLIFIED METHOD AND CORRELATED WITH FLUORINE DATA IN FOUR WYOMING CITIES

Walter J. Pelton, D.D.S., M.S.P.H.

SEVERAL studies have shown that dental caries and tooth loss vary in different geographic areas.[1-3] Similarly, a number of studies have shown that dental caries prevalence rates in children are influenced by the amount of fluorides in the domestic waters.[2, 4, 5] It has also been established that age, sex and familial differences affect prevalence of dental caries.[6-10]

Since the children in one community may have more or less dental caries than the children in another community, the need for dental care is not uniform. Knowledge of specific dental caries attack rates as well as the tooth loss at given ages aids greatly in planning community dental programs.

It has been demonstrated that children born and reared in a community having from 0.5 to 1.5 ppm. of fluorine[11] in the domestic water supply have relatively low rates of decay.[2, 4, 5] Conversely, children born and reared in communities which have little or no fluorine have relatively high dental caries attack rates. Children in very high fluoride areas (more than 1.5 ppm.) have low decay rates but are subject to unsightly discoloration and hypoplasia of the enamel.[12, 13] Public waters containing 1.0 to 1.5 ppm. of fluorides are believed to give calcifying permanent teeth the maximum protection against caries without causing

Read before the Joint Session of the Dental Health Section, American Public Health Association and American School Health Association, Boston, November 9, 1948.

Acting Dental Director, Wyoming State Department of Health; Senior Dental Surgeon, U. S. Public Health Service, Denver.

1. Hagan, T. L., Dental Caries Prevalence and Tooth Mortality—A Study of 24,092 Georgia Children in Twelve Communities. *Pub. Health Rep.* 62:1757 (Dec. 19) 1947.

2. Dean, H. T., and others, Domestic Water and Dental Caries. II. A Study of 2,832 White Children, Age 12-14 years, of 8 Suburban Chicago Communities, Including Lactobacillus Acidophilus Studies of 1,761 Children. *Pub. Health Rep.* 56:761 (April 11) 1941.

3. Klein, H., and Palmer, C. E., Dental Caries in American Indian Children. *Pub. Health Bull. 239* (Dec.) 1937.

4. Dean, H. T., Endemic Fluorosis and Its Relation to Dental Caries. *Pub. Health Rep.* 53:1443 (Aug. 19) 1938.

5. Dean, H. T.; Arnold, F. A., Jr., and Elvove, E., Domestic Water and Dental Caries. V. Additional Studies of the Relation of Fluoride Domestic Waters to Dental Caries Experience in 4,425 White Children, Age 12 to 14 years, of 13 Cities in 4 States. *Pub. Health Rep.* 57:1155 (Aug. 7) 1942.

6. Klein, H.; Palmer, C. E., and Knutson, J. W., Studies on Dental Caries. I. Dental Status and Dental Needs of Elementary School Children. *Pub. Health Rep.* 53:751 (May 13) 1938.

7. Klein, H., and Palmer, C. E., Studies on Dental Caries. IX. The Prevalence and Incidence of Dental Caries Experience, Dental Care, and Carious Defects Requiring Treatment in High School Children. *Pub. Health Rep.* 55:1258 (July 19) 1940.

8. Klein, H., and Palmer, C. E., Studies on Dental Caries. VII. Sex Differences in Dental Caries Experience of Elementary School Children. *Pub. Health Rep.* 53: 1685 (Sept. 23) 1938.

9. Klein, H., and Palmer, C. E., Studies on Dental Caries. V. Familial Resemblance in the Caries Experience of Siblings. *Pub. Health Rep.* 53:1355 (Aug. 5) 1938.

10. Klein, H., The Family and Dental Disease. V. Caries Experience Among Parents and Offspring Exposed to Drinking Water Containing Fluoride. *Pub. Health Rep.* 62:1247 (Aug. 29) 1947.

11. In this paper "parts per million," usually written "ppm." of fluorine or fluoride content of water always means the number of parts per million of the element fluorine, not of a compound of fluorine in the water.

12. McKay, F. S., Mottled Enamel: The Result of a Change of Water Supply at Bauxite, Arkansas: Ten Years Afterward. *J.A.D.A.* 26:900 (June) 1939.

13. Dean, H. T., and McKay, F. S., Production of Mottled Enamel Halted by a Change in Common Water Supply. *Am. J. Pub. Health* 29:590 (June) 1939.

Table 1

Town	Date	Fluorine, ppm.
Cheyenne, reservoir	2-21-46	1.0
Cheyenne, tap	4- 2-48	1.0
Cheyenne, tap, 314 W. 20th	4-24-46	1.0
Cheyenne, private well	10- 1-47	0.1
Cheyenne, Rook Crest	10- 8-47	1.5
Gillette	4-24-46	8.0
Gillette, shallow well	4-24-46	1.1
Gillette	10-12-47	8.0
Gillette, John Reed well	3-18-48	0.4
Sheridan	4-24-46	0.3
Sheridan, Goose Creek	4- 2-48	0.0
Torrington	11- 3-47	0.5
Torrington, town supply	4- 2-48	0.3

significant changes in color or development.

The basis for measuring dental caries experience has been a simple count of teeth showing dental caries, past or present, at the time of examination. Caries experience rates, caries attack rates and caries prevalence rates, as generally used, are synonymous with DMF rates. The symbol DMF indicates decayed, missing or filled permanent teeth, each tooth being counted only once. When a summation of DMF teeth is expressed per child or per 100 children the figure becomes a rate which is meaningful only when expressed for specific age groups.

In a general way the loss of permanent teeth in children, or tooth mortality, bears somewhat the same relation to the problem of dental caries as specific death rates bear to the problem of other disease entities. Although death rates alone are not satisfactory indicators of the health of the community or nation, the study of such rates has assisted enormously in recent mass attacks on disease. Similarly, tooth mortality rates when studied in connection with caries attack rates give a more complete picture of the dental status of children. For instance, it is known that proper placement of fillings prevents the extension of decay. Adequate dental care may be expected to reduce considerably the tooth mortality rate in children who have a high incidence of dental caries. Dean[2] for one has shown this to be the case in his study of eight Chicago communities.

Recently, Knutson[14,15] has shown that tooth mortality data can be obtained quickly and that the average number of teeth affected by dental caries can be obtained by computation from the percentage of children in each age group who have some evidence of decay, past or present (decayed, missing or filled). Knutson's simplified method eliminates the time-consuming detailed examination, reduces the disturbances in schools to a minimum, and generally speeds up the entire procedure of gathering data. This technic of determining caries rates is a distinct advancement in health status evaluation and its use takes dental health programs out of the realm of speculation, rationalization and supposition.

Purpose

The purpose of the present study was to measure, if possible, the difference in the dental caries attack rates of children living in communities having different concentrations of fluorides and to determine whether children who gave histories of continuous residence in a given community had different caries attack rates from children who had not lived in the community all their lives. It was desirable also to learn whether the tooth mortality rates differed between groups and between cities.

14. Knutson, J. W., An Index of the Prevalence of Dental Caries in School Children. *Pub. Health Rep.* 59:253 (Feb. 25) 1944.

15. Knutson, J. W., Simplified Procedure for the Collection of Basic Data for Dental Program Planning and Appraisal. *Am. J. Pub. Health* 37:1439 (Nov.) 1947.

Dear Parent:

The schools have agreed to cooperate with the Wyoming State Board of Health in making a study of tooth decay among the children. Dentists will come to the schools in the near future to examine all the pupils. They are particularly interested in those who have lived in this city all their lives and have always used water from the city water supply.

Please complete and return this blank to the teacher as soon as possible.

Child's Name_____ Birthdate_____

Is the water used in the home obtained from the city water system? Yes_____

No____ Has the child used this water throughout his life? Yes_____ No_____

Has the child lived outside the limits of the town for three months or more at any one time? Yes_____ No_____

Parent's Name_____

Address _____

Figure 1

Furthermore, with the reinstitution of the dental program in the Wyoming State Department of Health, it was desirable to obtain a base line of dental conditions in representative cities so that any accomplishments of the programs in operation or the programs to be undertaken could be accurately measured and evaluated.

Method

The selection of the places studied was largely based on size of city so that the number of children in each age group would be large enough to provide reliable data. One of the main considerations, as indicated previously, was the fluoride content of the communities' domestic water supply. Table 1 shows the fluoride determinations for the towns chosen, as established by water analysis performed by the Wyoming State Health Department. Although fluoride determinations are available for many other Wyoming communities, it seems unnecessary to list them here.

It will be noted that Sheridan has little or no fluorine in its water supply, Torrington has 0.3 to 0.5 ppm. fluorine and Cheyenne has 1.0 ppm. According to L. O. Williams, sanitary engineer of the Wyoming State Department of Health, the water supplies in the survey cities, except Gillette, have been unchanged for at least 15 years. Water records show that Gillette used its shallow wells (1 ppm. F) exclusively, from prior to 1930 until 1939, when deep wells (8.0 ppm. F) were constructed. Because the waters from the deep wells with the high fluoride concentration were much softer, these waters were used almost entirely when demands were not high enough to necessitate putting the reserve wells (low fluoride) into operation.

Several weeks prior to the dental inspections in the schools, the school nurses of Sheridan, Torrington and Cheyenne were supplied with mimeographed questionnaires which were sent to each child's parents (Fig. 1). Three questions were asked, the answers to which determined the child's residence status. The questions could be answered by checking "yes" or "no" and a space was provided for the parent to sign his name and ad-

WYOMING
DEPARTMENT OF PUBLIC HEALTH
DIVISION OF DENTAL HEALTH

DENTAL SURVEY

COUNTY Sheridan SCHOOL Taylor EXAMINER W. J. Pelton
CITY Sheridan ADDRESS _____ DATE 11-1-48

NAME OF PUPIL	AGE	SEX	PERMANENT TEETH (EXCEPT FOR FILLINGS)						REMARKS
			DMF	FILLINGS		MISSING			
				P	D	EXTRACTION INDICATED	EXTRACTED	TOTAL	
Jones, Mary	9	F	+	+	+	0	0	0	
Smith, Jane	9	F	+	0	0	$\underline{6}$	$\underline{\lvert 6}$	2	
White, Peter	9	M	+	+	0	0	0	0	2 congenitally missing
Lee, James	9	M	+	0	0	0	$\underline{6\rvert 6}$	2	
Mans, Vern	9	M	+	+	+	$\underline{\lvert 6}$	0	1	

Fig. 2.—Inspection form

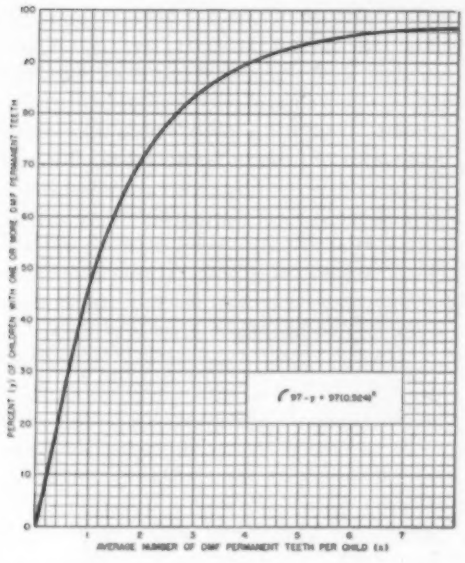

Fig. 3.—Graph for estimating the average number of DMF teeth per child from the determined percentage of children in the age group who have at least one DMF tooth

dress. The note served as a consent slip for the dental examination as well as a water history for the child, and all children were instructed to bring the executed mimeographed note to the school prior to the examination. Children who gave histories of continuous residence were considered natives. Children whose slips indicated they were born elsewhere, lived elsewhere or had been away from the study city for periods of more than 90 days were considered migrants.

Dentists practicing in the survey cities assisted with the examinations, and frequently volunteers from parent-teacher groups recorded the data as the examining dentists called out the findings. Inspections were conducted in selected school rooms using natural light, mouth mirrors and explorers, and the data were recorded on the standard form recommended by Knutson[15] (Fig. 2).

The determination of the DMF rate

Table 2.—Children affected by specified dental conditions, among 8,229 Wyoming school children (1947 and 1948)

City	Age last birthday												
	6	7	8	9	10	11	12	13	14	15	16	17	18
	Age distribution of children												
Sheridan	125	230	166	188	167	159	183	194	196	175	166	142	40
Torrington	42	126	89	91	109	104	108	115	98	90	59	60	23
Cheyenne	466	441	392	472	407	346	375	448	352	340	289	259	67
Gillette	30	39	37	43	55	29	37	33	23	4	.....	.....	.....
	Number of children with at least one DMF permanent tooth												
Sheridan	32	129	112	141	129	131	161	179	181	171	157	138	39
Torrington	14	55	43	55	63	71	73	95	72	75	46	52	18
Cheyenne	48	99	148	245	242	222	271	354	289	277	234	226	50
Gillette	4	7	11	19	29	19	21	24	15	3	.....	.....	.....
	Percentage of children with at least one DMF permanent tooth												
Sheridan	25.6	56.1	67.5	75.0	77.2	82.4	88.0	92.3	92.3	97.7	94.6	97.2	97.5
Torrington	33.3	43.7	48.3	60.4	57.8	68.3	67.6	82.6	73.5	83.3	78.0	86.7	78.3
Cheyenne	10.3	22.4	37.7	51.9	59.4	64.1	72.2	79.0	82.1	81.4	80.9	87.2	74.6
Gillette	13.3	17.9	29.7	44.1	52.7	65.5	56.7	72.7	65.2	75.0	.....	.....	.....
	Number of missing permanent teeth												
Sheridan	2	7	5	19	21	49	57	83	171	168	152	147	78
Torrington	0	0	0	1	4	12	18	34	40	65	23	27	5
Cheyenne	0	4	11	16	25	50	83	113	107	80	129	137	34
Gillette	0	0	0	0	2	1	5	8	4	2	.....	.....	.....
	Number of missing permanent teeth per child												
Sheridan	.016	.030	.030	.101	.126	.308	.311	.429	.872	.960	.916	1.035	1.950
Torrington	0	0	0	.011	037	.115	.167	.296	.408	.722	.390	.450	.217
Cheyenne	0	.009	.028	.033	.061	.144	.221	.252	.303	.235	.446	.528	.507
Gillette	0	0	0	0	.036	.034	.135	.242	.173	.50	.....	.....	.....
	Number of children with at least one filled permanent tooth												
Sheridan	11	40	58	75	79	81	111	136	151	142	137	121	33
Torrington	2	9	11	17	28	27	30	49	44	42	31	37	10
Cheyenne	3	16	44	96	97	89	169	203	180	192	184	180	44
Gillette	0	3	1	5	6	4	9	10	5	1	.....	.....	.....
	Percentage of children with at least one filled permanent tooth												
Sheridan	8.8	17.4	34.9	39.9	47.3	51.0	60.7	70.1	77.0	81.1	82.5	85.2	82.5
Torrington	4.8	7.1	12.4	18.7	25.7	26.0	27.8	42.6	44.9	46.7	52.5	61.7	43.5
Cheyenne	0.6	3.6	11.2	20.3	23.8	25.7	45.1	45.3	51.1	56.5	63.7	69.5	65.7
Gillette	0	7.6	2.7	11.6	10.9	13.7	24.3	30.3	21.7	25.0	.....	.....	.....
	Number of children with at least one filled deciduous tooth												
Sheridan	51	86	70	66	55	32	12	3	4	1	2	0	0
Torrington	7	32	25	14	16	8	3	1	0	2	0	0	0
Cheyenne	100	112	114	144	83	52	27	8	5	3	2	1	0
Gillette	3	5	7	6	9	2	3	1	0	0	.....	.....	.....
	Percentage of children with at least one filled deciduous tooth												
Sheridan	40.8	37.4	42.2	35.1	32.9	20.1	6.6	1.5	2.0	0.6	1.2	0	0
Torrington	16.7	25.4	28.1	15.4	14.7	7.7	2.8	0.9	0	2.2	0	0	0
Cheyenne	21.5	25.4	29.1	30.5	20.4	15.0	7.2	1.8	1.4	0.9	0.7	0.4	0
Gillette	10.0	12.8	18.9	13.9	16.3	6.8	8.1	3.0	0	0	.....	.....	.....
	Average number of DMF teeth per child												
Sheridan	0.5	1.3	1.8	2.2	2.4	2.9	3.7	4.7	4.7	7.6	5.6	7.4	7.5
Torrington	0.7	0.9	1.0	1.4	1.4	1.8	1.8	2.9	2.2	3.0	2.5	3.4	2.5
Cheyenne	0.2	0.4	0.8	1.1	1.4	1.6	2.0	2.5	2.8	2.7	2.7	3.5	2.2
Gillette	0.3	0.4	0.6	0.9	1.2	1.7	1.3	2.1	1.7	2.2	.....	.....	.....

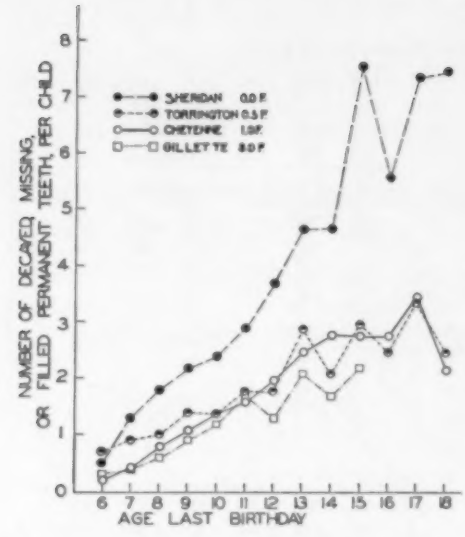

Fig. 4.—Estimated number of DMF teeth per child among 8,229 Wyoming children, computed by use of Figure 3

is based on Knutson's description of the relation between the proportion of age-specific children with caries experience in at least one permanent tooth and the average number of permanent teeth so affected per child.[15] Knutson considers that though a prevalence rate of a kind is obtained by the determination of the proportion of children of a given age with caries experience, quantitative data on the average number of teeth so affected per child frequently are desirable. Such data are particularly useful since it has been shown that dental caries in permanent teeth of children accrue at a regular yearly rate during the age span of 6 to 18 years. The relation is shown graphically in Figure 3.

Tooth mortality from caries experience is an expression of missing permanent teeth and permanent teeth indicated for extraction. In children, loss of permanent teeth by extraction usually means loss from caries experience. In doubtful cases verification was obtained by questioning the child. Teeth indicated for extraction generally were those which, as far as inspection would reveal, had involvement of the pulp due to caries. The indication for tooth loss should not be construed to mean that certain teeth with pulp involvement could not be restored for service. Rather it is an indication of the severity of caries experience or evidence of inadequate dental care. Teeth lost through trauma were not included in the tooth loss rates.

Filled teeth were the only data recorded for the deciduous dentition. All other information obtained in the survey relates to the permanent dentition.

Findings and Discussion

Table 2 shows the data collected in the four cities.

Figure 4 indicates graphically the differences in the number of DMF teeth per child in the four study cities. The DMF rates were estimated by the method de-

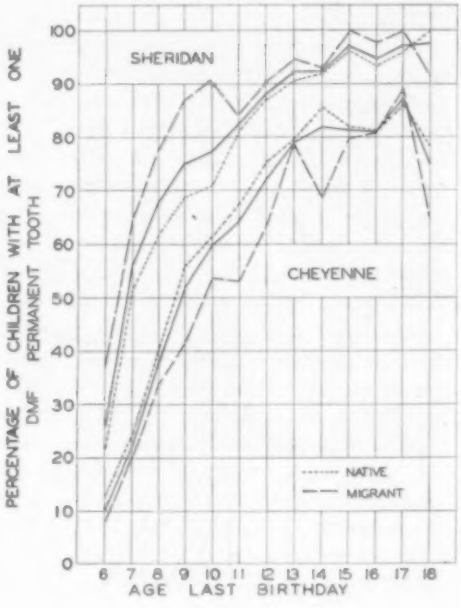

Fig. 5.—Percentage of children with at least one DMF tooth, among 2,131 Sheridan and 4,654 Cheyenne school children.

veloped by Knutson. An example of the application of this method is as follows: 25.6 per cent of children aged 6 years in Sheridan had one or more DMF permanent teeth. To estimate the number of DMF teeth per child from this observed percentage, a horizontal line is drawn from the 25.6 per cent point on the vertical axis of Figure 3 until it intersects the curve. From this point of intersection, a vertical line is dropped to the base line of the figure, and a reading of 0.5 DMF teeth per child is obtained. In Cheyenne, where only 10.3 per cent of 6 year old children have DMF teeth, the average number of DMF teeth per child, determined by following this procedure, is 0.2.

It is apparent that the Sheridan children have a rate of decay which is approximately twice that of the children living in any of the other three cities. Figure 4 also shows that children using

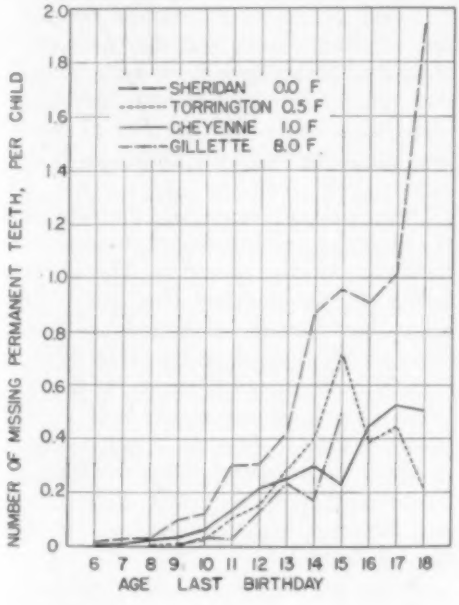

Fig. 6.—Tooth mortality (extracted or extraction indicated) of 2,131 Sheridan, 1,114 Torrington, 4,654 Cheyenne and 330 Gillette school children

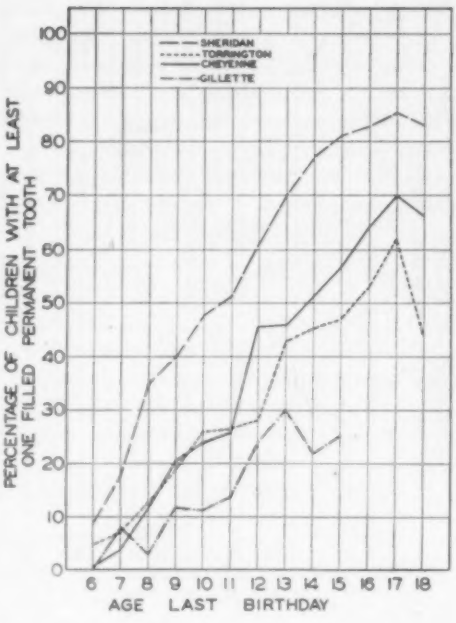

Fig. 7.—Percentage of children with at least one filled permanent tooth, among 2,131 Sheridan, 1,114 Torrington, 4,654 Cheyenne and 330 Gillette school children

community waters in Wyoming having 0.5 ppm. fluorine (in Torrington) and 8.0 ppm. fluorine (in Gillette) have about the same caries experience as children who use water with the ideal concentration of fluorine found in Cheyenne. While it is acknowledged that the fluoride concentration at Gillette is too high, the graph seems to indicate that the Torrington water, containing 0.3 to 0.5 ppm. fluorine, is associated with the same protection to the permanent teeth as the Cheyenne water, containing 1 ppm. fluorine. Plans are being considered to solve the problem of excess fluorides in the public waters of Gillette.

If the children in Cheyenne are considered the norm, then the findings in Gillette (1.0 to 8.0 pp. F) show about what might be expected of teeth that calcify while the child is exposed to fluoride waters above 1.5 ppm. Gillette

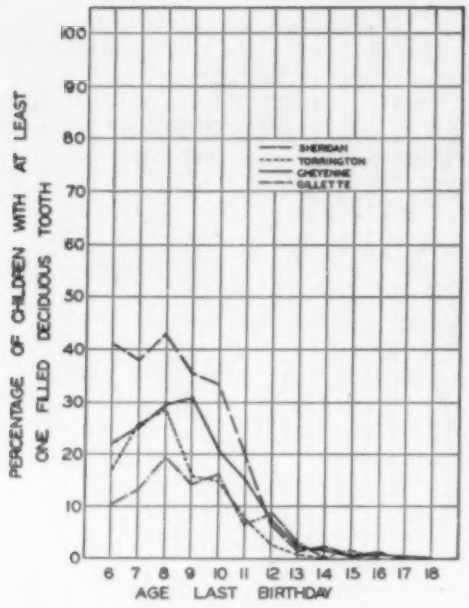

Fig. 8.—Percentage of children with at least one filled deciduous tooth, among 2,131 Sheridan, 1,114 Torrington, 4,654 Cheyenne and 330 Gillette school children

children above the age of 10 show a slightly lower rate of caries attack than those of Cheyenne. This is not particularly significant since it is presumed that these Gillette children consumed water of the same fluoride concentration as the Cheyenne children, because the high fluoride water was not put into use until 10 years ago. Prior to that time it must be assumed that the children who are now older than 10 consumed water containing 1 ppm. fluorine.

In Figure 5 it will be noted that the relative position of the natives (continuous water histories) and the migrants (broken water histories) differs in Sheridan and Cheyenne. This is a curious phenomenon, and if it is to be explained on the basis of fluorine alone, then it must be assumed that the Sheridan natives have been exposed to waters of slightly higher fluorides than the migrant children now attending the schools in that city. On the other hand, although the natives of Cheyenne have been exposed to waters containing "ideal" amounts of fluorine, the migrant children apparently have a slightly better dental status. Full explanation of these findings would, of course, rest on water analysis of all farm and home sources of water as well as complete information on the waters consumed in other states where migrant children may have lived during part of the time that their permanent teeth were calcifying. Of course there are other factors, such as carbohydrate intake, which influence the caries experience of individuals, as well as some unknown factors which might well influence mass data of these kinds. Likewise, fluorine, whether ingested during the calcification period or applied topically to erupted permanent teeth, is at best only a partial preventive of dental caries.

Perhaps the most significant findings of the entire study are shown in Figure 6, which illustrates graphically the ravages of dental caries and the end results of decay. Conservatively, it may be said that the children of Sheridan are losing more than twice the number of teeth that are being lost by children in Cheyenne.

Information concerning the number of children receiving dental treatment is shown in Figures 7 and 8. The graphs reflect the obvious fact that more children have caries in Sheridan; hence more children need and receive fillings. Although the data on caries of the deciduous teeth are not available from this study, Figure 8 suggests a much larger number of deciduous teeth involved in Sheridan than in the other study cities, and hence a higher filling rate in deciduous teeth.

If the attack rates of the deciduous teeth are as similar in Torrington, Cheyenne and Gillette as the attack rates of the permanent teeth, it appears that a more complete dental care program is

in operation in Cheyenne, with Torrington a close second.

Discussion

1. The foregoing study illustrates the practical application of base line data obtained by using Knutson's simplified method.

2. The data presented show that the dental caries attack rates (DMF) in Sheridan children are approximately twice those of children in Torrington, Cheyenne and Gillette, and that the tooth loss rates have similar ratios.

3. The fluoride concentrations of the public waters may be directly correlated with the dental caries picture in the study cities.

4. The presumptive evidence from this study corroborates the results of other studies on the relation of fluoride-bearing waters to dental caries incidence and suggests that consideration be given to the desirability of introducing optimum amounts of fluorides into Wyoming community waters that are now fluoride-free. Such treatment should be undertaken only when a community has a safe water supply and when the fluorination is carried out under the supervision of competent public health and sanitary engineering authorities.

PUBLIC DENTAL HEALTH PROGRAMS IN SWITZERLAND

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BECAUSE the incidence of dental disease in Switzerland is high, with 85 to 100 per cent of school children affected by caries, interest in improving dental hygiene, stimulated by dentists, is growing. Complete dental treatment for the whole population would be impossible at present, and the citizens seem disinclined to accept nationalization of dental service. Only in Basel is there a regular popular dental clinic for adults, though in Geneva, Zurich and Berne as well, adults and children can get dental care at reduced rates from dental schools. These, however, have limited capacity and long waiting lists of patients. The Swiss Dental Association has stated repeatedly that school dental service must be the basis of social dental service for adults and adolescents and has stressed the importance of education and prophylaxis as well as treatment.

The Commission of Dental Hygiene is active in the field in the French-speaking part of the country, and the orthodontic department of the Dental Institute of the University of Zurich intends to take up school and social dentistry.

History of School Dental Care

Dentists throughout Switzerland took the initiative in setting up programs for examination and treatment of school children. The first year school dental clinic was started in Lucerne in 1907, one year before the first such clinic in the

From the central office for school and popular dentistry of the Swiss Dental Association.

United States and five years after the first in Germany. Six other school dental clinics were founded by 1914.

The Swiss Dental Association, including nearly all practicing dentists with the federal diploma in Switzerland, made an effort in 1916 to draw up a plan of dental hygiene for the whole country. Under the stimulus of a paper read at the annual meeting by Reutlinger,[1] a special commission of hygiene was elected to study the problem. The commission recommended organization of school dental clinics as a means of securing the best possible results for the whole country, and stressed the importance of the educational and prophylactic parts of the problem.

At the suggestion of the special commission on hygiene, the association commissioned Brodtbeck[2] to write a paper on the value of the hygiene of the mouth and the teeth and the importance of school dental clinics. The paper gave a good picture of the incidence of caries in Switzerland, and proposed ways in which it could be combated.

In 1923, the association decided to establish a bureau for dental hygiene and asked the government for an annual subsidy, but the head of the department of public health expressed the opinion that the problem was up to the cantons and individual communities. The association continued to work on the matter with its own means. The central office for school and popular dental hygiene started work in 1925 as a section of the association. Stoppany, its director, made of the central office a center of information on public dental hygiene and social dental problems, and spread information through lectures, exhibitions on dental hygiene and papers[3] in German, French and Italian. At present the central office in Zurich has copious dental health education material, which may be rented at a small fee, and furnishes a manual to every member of the association who wishes to work in school dentistry.[4]

Present State of School Dental Service

The goal of the Swiss school dental program is to give children dental care throughout their school years and to reduce decay as much as possible through sound prophylaxis, so they will leave school with a set of well functioning teeth, with sound knowledge of dental care and with the desire for further regular examinations and treatment.

In most communities it is recognized that a start must be made with one or two classes of children. Every child in the youngest classes is examined and treated the first year. The following year the same children are examined and treated, and the program is extended to the entering class. In this way, after six or seven years all children in school are receiving regular dental care. Usually emergency treatment is provided for children of classes not receiving regular attention. Because caries is common, the condition of the deciduous teeth of children entering school does not always allow operative treatment, and efforts are directed principally to permanent teeth.

In nearly all communities where dental service has been established, examination is compulsory and is financed by the community, sometimes with the aid of the canton. Treatment is compulsory only in a few cantons, but wherever school dental service is functioning satisfactorily, most persons take advantage of it. As a rule, written consent of parents for enrolling children in the dental service is requested. In many

1. Reutlinger, A., Die Unterordnung der Ausbildung der Zahnärzte unter die Bedürfnisse des Staates. *Schweiz. Vrtljschr. f. Zahnh.* 26:319, 1916.

2. Brodtbeck, Die zahnärztliche Hilfe im Dienste der schweizerischen Jugend.

3. Stoppany, G. A., Kritik, Wesen and Ziele der Schulzahnklinik und die Möglichkeiten zu deren Durchführung. *Schweiz. Monatschr. f. Zahnh.* 11:659, 1926.

4. The central office for school and popular dentistry seems to be comparable with the Council on Dental Health and the Bureau of Public Information of the American Dental Association.

places examination and treatment are carried out during school hours.

The school dental service usually ceases with the end of compulsory school, at 15 or 16 years, but in some places it includes the higher public schools and some schools of industry. Efforts are being made to extend service to youths who have received regular care in school and are not in a position after leaving school to pay for private treatment. With growing consciousness of the importance of adequate nutrition for prospective mothers and for children under school age, service probably will be extended to these groups, and already many communities give dental service to children in kindergarten.

The extent of dental treatment given by the school dental service varies in different places. Ordinary fillings of silver amalgam or silicate cement make up the principal part of the work. Odontotomy is carried out in several clinics. Root treatment of permanent teeth is rather exceptional if systematic treatment is done. In the school dental clinics of Zurich, for instance, there were only 613 root fillings among 33,951 fillings. Orthodontic treatment is allowed in some services. Symmetric extraction of the first permanent molars (and sometimes of bicuspids) is often practiced, especially in the German-speaking part of the country, because of frequent deep decay. Because extraction often will be necessary later, owing to apical infection, extraction is done in carefully selected cases before eruption of the second molars, to maintain a sound dental arch and thus eliminate one cause of traumatic malocclusion and caries.

Financial Organization

The dental association believes that the school dental service should be financed by the state, the cantons, the communities and the parents of children enrolled. The federal government does not take part, however.

The furnishing and outfitting of clinics is paid for by the community, sometimes with the aid of the canton. The community also finances the compulsory examination of teeth. Lay promoters of the school dental program and the majority of dentists oppose free school dental service, and the load, therefore, is distributed between communities and cantons on one side and parents on the other, on the basis of ability to pay.

In most places the dentist makes an estimate of treatment after the examination, with fees based on a manual issued by the dental association. The records are examined by the local commission of dental hygiene, which decides the amount to be billed to the parents. The reports of the dentist and of the commission are presented to the parents for approval.

In others the community pays a fixed sum per child per year or a certain percentage of the fee for each treatment. Parents who cannot afford to pay the balance may request a reduction. In the school dental clinics of Zurich more than 22,000 children were treated in 1948, 72 per cent without charge. The city paid almost 458,000 francs ($107,000) of this, the parents 47,000 francs ($11,000). There are 17 school dentists.

Types of School Dental Service

Three methods of providing dental care for school children are common.

In small or average communities, local dentists in private practice devote part of their time to school dental service, using their own equipment and materials. If several local dentists participate, parents usually have the choice of a dentist, although in a few places children are assigned to a dentist by classes. The fees are considerably lower than the average rates in private practice. As a rule, dentists are paid for services rendered; in a few instances they receive an annual sum.

Many large villages and cities have permanent school dental clinics, installed in a special building or at the school.

The work is done by a local dentist on a part time basis, with payment per hour, per year or per item of work, or by one or several full time school dentists with a fixed annual salary. Zurich and Lausanne have several school clinics. In a few districts children travel from different communities to central dental clinics for treatment.

In regions made up of small, dispersed communities with no dentist at hand, traveling school dental clinics are used. A dentist and his assistant, equipped with a portable kit, travel from village to village. A room is furnished for the purpose. The first such traveling clinic was organized in the canton of Schaffhausen, which has 36 communities. The city of Schaffhausen has its own school dental clinic, but the 35 other communities have used the traveling system established twenty-five years ago and have found it satisfactory. The traveling dentist is engaged full time with an annual salary or part time with fees for work accomplished. He may have a private practice also. The system is much appreciated in many communities, because disturbances of the school and loss of time are minimized. On the other hand, the equipment is not always good.

Of the 19 cantons and 6 half-cantons in Switzerland, 7 cantons and 4 half-cantons have universal school dental service. In others service exists in many places. Three cantons and 2 half-cantons only are left with little or no school dentistry.

Of the 3,089 communities, about 900 have some sort of school dental service, especially the larger places. In 669 communities local dentists furnish the service; the others are attended by 28 regular and 5 traveling school dental clinics.

Dental Planning

During the last war, the Swiss were forced to change their eating habits. Reductions in sugar and other carbohydrates, increases in vegetables and fruits and in raw foods and the use of whole corn bread apparently had a good influence on the teeth. The reasons for this are being studied.

The action of fluorine on the teeth has been given attention recently. Following the example of American and other authors, dentists have been examining teeth and submitting drinking water to chemical analysis.[5] Results were in close accord with those reported by American investigators. I have found topical application of fluorine preparations to be preferable to treatment of drinking water. The opinions of our leading men in dental research are still differing as to the efficiency of the fluorine treatment in the prophylaxis of dental caries and the problem seems not to be solved yet.

The uses of auxiliary personnel to augment dental service have not been explored. The dentist's assistant usually is a girl, who need not be a trained nurse. Trained dental hygienists are unknown, and only the dentist works on the patient. —*6 Zuerichstrasse.*

5. Tschäppät, Karl, Ueber die lokale Fluorapplikation zur Kariesprophylaxe und ihre statistische Auswertung mit dem "Berner Kariesindex." *Schweiz. Monatschr. f. Zahnh.* 58:961 (Nov.) 1948.

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Forceps.—The hinges of extraction forceps may be loosened with a few drops of liquid ammonia. —*Boletin Dental Argentino 28:424, August 1947.*

RELATION BETWEEN CARIES EXPERIENCE AND POLIOMYELITIS IN MINNEAPOLIS SCHOOL CHILDREN (1946 EPIDEMIC)

H. Berton McCauley,* D.D.S.; R. C. Likins,† D.D.S., and Francis A. Arnold, Jr.,‡ D.D.S., Bethesda, Md.

THE route by which the virus of poliomyelitis gains access to the brain and spinal cord is a subject of paramount interest. The membranes of the respiratory and alimentary tracts have been studied extensively as potential portals of entry, but no specific path or paths have been generally accepted as the route for natural infections.[1-6] Since 1942, evidence has accumulated suggesting that exposed dental pulps may constitute a portal of significance.[7-11]

Histologic observation of extensive poliomyelitic lesions in the semilunar (gasserian) ganglions of a cynomolgus monkey after oral application of poliomyelitis virus by Faber and Silverberg[6] prompted Aisenberg and Grubb[7, 8] to study this problem further in rhesus monkeys. The crowns of the anterior teeth of five animals were isolated with rubber-dam and the pulps were removed. One or more drops of a 20 to 60 per cent suspension of the Creach strain of poliomyelitis virus was sealed in each vacated pulp chamber. This resulted in paralytic infection of one of the animals and nonparalytic infection of the others. Histopathologic changes consistent with poliomyelitis were observed in the gasserian ganglions and spinal cord of all the animals.

To test the hypothesis clinically, Aisenberg[8, 9] examined the teeth of 272 poliomyelitis patients in western North Carolina (1944), 103 in Baltimore (1944) and 83 in northern New Jersey (1945). His observations were consistent. In more than half (54 to 70 per cent) of the patients examined there was visible exposure of one or more dental pulps. In contrast, about a fourth of 501 nonpoliomyelitic control subjects showed evidence of pulpal exposure.

Supporting these observations, Reese and Frisch[10] found exposed pulps in 24 of 36 (67 per cent) observed poliomye-

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1. Howe, H. A., and Bodian, D., Portals of Entry of Poliomyelitis Virus in the Chimpanzee. *Proc. Soc. Exper. Biol. & Med.* 43:718 (April) 1940.

2. Howe, H. A., and Bodian, D., Neuropathological Evidence on the Portal of Entry Problem in Human Poliomyelitis. *Bull. Johns Hopkins Hosp.* 69:183 (Aug.) 1941.

3. Faber, H. K.; Silverberg, R. J., and Dong, L., Poliomyelitis in the Cynomolgus Monkey: Comparison of Upper Portion of Alimentary Tract With Its Lower Gastrointestinal Portion as Port of Entry. *J. Exper. Med.* 78:499 (Dec. 1) 1943.

4. Faber, H. K.; Silverberg, R. J. and Dong, L., Poliomyelitis in the Cynomolgus Monkey: Infection by Inhalation of Droplet Nuclei and the Nasopharyngeal Portal of Entry. *J. Exper. Med.* 80:39 (July 1) 1944.

5. Hovanic, K. J., The Portal of Entry of Poliomyelitis. (Review) *Arch. Pediat.* 62:563 (Dec.) 1945.

6. Faber, H. K., and Silverberg, R. J., Pathway of Invasion in a Cynomolgus Monkey After Oral Application of Poliomyelitis Virus. *Science* 96:473 (Nov. 20) 1942.

7. Aisenberg, M. S., and Grubb, T. C., Poliomyelitis Induced by Inoculation of Tooth Pulp Cavities. *J. Bact.* 46:311 (Sept.) 1943.

8. Aisenberg, M. S., and Grubb, T. C., Exposed Pulps of Teeth as the Portal of Entry for Poliomyelitis Virus. *J.A.D.A.* 32:555 (May 1) 1945.

9. Aisenberg, M. S., Further Studies of Exposed Pulps as the Portal of Entry for Poliomyelitis Virus. *J.A.D.A.* 33:1109 (Sept. 1) 1946.

10. Reese, H. H., and Frisch, J. G., The Carious Tooth as a Portal of Entry for Poliomyelitis: A Progress Report. *D. Digest* 52:368 (July) 1946.

11. Reese, H. H., and Frisch, J. G., The Carious Tooth as a Portal of Entry for Poliomyelitis. *Indust. Med.* 16:145 (March) 1947.

litic patients and in 39 of 147 (27 per cent) control subjects in Madison, Wisconsin (1945). The same authors[11] contended that a carious lesion need not actually involve the tooth pulp to permit access of the virus to the pulpal nerve plexus. This latter assumption was based on the possibility that the virus may gain admission to the dental pulp through the dentinal tubules, but direct evidence to support this assumption is lacking.

Aisenberg[9] and Reese and Frisch[10] also reported an increased prevalence of poliomyelitis in areas in which domestic water supplies contain less than the optimal concentration (1 part per million) of fluorine for caries control.[12] Indicative though the findings of these investigators[8-10] may appear, the data are not conclusive. The method of selection of controls is subject to criticism and the determination of comparable risk of exposure to poliomyelitis is difficult.[13]

In contrast, studies reported by Finn, Korns and Bahlke,[13, 14] Radden and Sandy,[15] and Cameron[16] offer no evidence of differences between poliomyelitis and control groups as regards the prevalence of exposed tooth pulps. Finn and his co-workers examined 151 poliomyelitis patients in upstate New York, and found that 56 (37 per cent) had one or more teeth in which the pulp was visibly exposed, but 59 of 148 (40 per cent) apparently healthy household contacts also had exposed pulps. Exposed dental pulps were likewise observed in 9 of 27 (33 per cent) bulbar type poliomyelitis cases and in 47 of 124 (38 per cent) cases diagnosed as nonbulbar type poliomyelitis.

Radden and Sandy[15] studied the incidence of exposed tooth pulps in 324 poliomyelitis patients in Victoria and Queensland (Australia) during the epidemics of 1945-1946. They encountered pulpal exposure in 27 per cent of the patients and in 25 per cent of 1,419 age-comparable control subjects. Cameron's survey[16] of 150 poliomyelitis cases and an equal number of controls in Sydney (Australia) showed similar results.

Occurrence of poliomyelitis in epidemic proportions among the school-age population of Minneapolis in 1946 presented an opportunity to investigate further the possibility of a relation between poliomyelitis and dental caries. The results of this study are reported here.

Method

Children aged 5 to 15 years at the time of the epidemic (June to October, inclusive) were the subjects of study. The teeth of 1,451 individuals, 748 boys and 703 girls, were examined between January 15 and March 15, 1947. All examinations were made in the schools by dental officers using a mirror and explorer.[17]

During the epidemic, poliomyelitis had been diagnosed in 264 of the subjects on the basis of clinical and laboratory evidence. These children are referred to as the case group. Four hundred and sixty-four children had histories of contact with an active case by reason of simultaneous membership in the same household, and constituted the contact group. The remaining 723 children examined formed a control group. Those in the control group were selected from

12. Dean, H. T.; Arnold, F. A., and Elvove, E., Domestic Water and Dental Caries. V. Additional Studies of the Relation of Fluoride Domestic Waters to Dental Caries Experience in 4,425 White Children, Aged 12 to 14 Years, of 13 Cities in 4 States. *Pub. Health Rep.* 57:1155 (Aug. 7) 1942.

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14. Finn, S. B.; Korns, R. F., and Bahlke, A. M., Exposed Dental Pulp as a Possible Portal of Entry for Poliomyelitis Virus. (Abstract) *J. D. Res.* 25:172 (June) 1946.

15. Radden, H. G., and Sandy, C. E., The Role of Teeth With Exposed Pulps in the Aetiology of Anterior Poliomyelitis. *Austral. J. Den.* 50:217 (Sept.) 1946.

16. Cameron, D. A., Observations on the Possible Significance of the Exposed Dental Pulp as a Portal of Entry for the Poliomyelitis Virus. *D. J. Australia* 19:25 (Jan.) 1947.

17. Examinations were conducted in more than 100 public and parochial schools throughout Minneapolis.

Table 1.—Caries experience and number of teeth exhibiting exposed pulps or existing as residual roots in 1,451 Minneapolis school children aged 5 to 15 years at time of examination

Age group	Study group	Children examined	Number of DMF permanent teeth*			Number of def deciduous teeth†			Number of teeth with exposed pulps‡		
			Total	Per 100 teeth	Per 100 children	Total	Per 100 teeth	Per 100 children	Total	Per 100 teeth	Per 100 children
5-6	Case	89	28	12.4	31	468	28.8	526	20	1.1	22
	Contact	92	27	10.6	29	429	26.7	466	17	.9	18
	Control	193	42	9.8	22	994	28.5	515	41	1.0	21
	All	374	97	10.7	26	1,891	28.1	506	78	1.0	21
7-8	Case	58	102	19.3	176	296	39.7	510	14	1.1	24
	Contact	122	274	23.5	225	660	46.6	541	53	2.1	43
	Control	170	331	20.2	195	895	43.7	526	61	1.7	36
	All	350	707	21.2	202	1,851	44.0	529	128	1.7	37
9-11	Case	58	206	20.6	355	184	52.6	317	9	.7	*16
	Contact	134	491	22.0	366	374	52.2	279	40	1.4	30
	Control	189	791	25.5	419	594	57.6	314	41	1.0	22
	All	381	1,488	23.5	391	1,152	54.9	302	90	1.1	24
12-15**	Case	59	569	37.1	964	18§	75.0§	164§	9	.6	15
	Contact	116	1,013	33.7	873	15§	51.7§	75§	28	.9	24
	Control	171	1,552	34.6	908	26§	65.0§	51§	9	.2	5
	All	346	3,134	34.7	906	59	63.4	72	46	.5	13
All age groups	Case	264	905	27.5	343	966	35.2	366	52	.9	20
	Contact	464	1,805	27.1	389	1,478	39.2	319	138	1.3	30
	Control	723	2,716	28.1	376	2,509	38.0	347	152	.9	21
	All	1,451	5,426	27.7	374	4,953	37.7	341	342	1.0	24

*Includes carious, indicated for extraction, missing and filled permanent teeth.
†Includes carious, indicated for extraction and filled deciduous teeth.
‡Permanent and deciduous, including teeth existing as residual roots.
§The number of children involved is the number in each study group 12 years old: 11, 20 and 51, respectively.
** The 12 to 15 age group contains four boys who had attained their sixteenth birthday at the time of dental examination.

school rolls to match, person for person, case and contact children in respect to age, sex and public school district.

Case and contact children were identified from case records maintained by the Minneapolis Division of Public Health. All persons included in the case group had exhibited symptoms of poliomyelitis and, according to the record, had yielded positive cell counts of the spinal fluid. Contact children had not developed conclusive symptomatic evidence of the disease and were not necessarily related familially to the case or cases contacted.

Control children were selected from school enrollments by personnel of the various public schools in whose districts case or contact children resided. Public school districts were divided if they included areas of markedly contrasting living environment (as indicated by statistics on crowding). Individual school staffs charged with selecting control children were supplied with a list of the case and contact children living in the school district, indicating the name, address, sex, age and race of each. With these data, they were instructed to choose children from the rolls to match each listed child by another living in the school district and of the same age (years), sex and race. Instructions were such as to eliminate so far as practicable prejudice induced by knowledge of a subject's status of dental health and care, or scholastic or other personal record.

The following were utilized to insure that possible case and contact children were not included among the controls: (1) understanding with persons who selected the control group and who generally were familiar with the status of the children in the school as regards poliomyelitis, (2) direct questioning of the children at the time of the dental examination, (3) information volunteered by teachers, school nurses, parents and guardians and (4) check of probable cases and contacts against lists made up from information supplied by the Minneapolis Division of Public Health.

Data pertinent to individual subjects were obtained by questionnaire sent to parent or guardian. The information included an identification of the subject and a history of residence and whereabouts during the period of the epi-

Table 2.—Caries experience and number of teeth exhibiting exposed pulps or existing as residual roots in 264 case children 5 to 15 years old

Group	Children examined	Number of DMF permanent teeth*			Number of def deciduous teeth†			Number of teeth with exposed pulps‡		
		Total	Per 100 teeth	Per 100 children	Total	Per 100 teeth	Per 100 children§	Total	Per 100 teeth	Per 100 children
Bulbar	44	169	29.4	384	161	37.2	447	7	0.7	16
Paralytic	74	242	28.7	327	271	33.5	459	17	1.0	23
Nonparalytic	146	492	26.3	337	500	35.1	413	28	0.8	19
Total	264	903	27.5	342	932	35.0	431	52	0.9	20

*Includes carious, indicated for extraction, missing and filled permanent teeth.
†Includes carious, indicated for extraction and filled deciduous teeth.
‡Permanent and deciduous, including teeth existing as residual roots.
§The number of children involved is the number from each group 12 years of age or younger: 36, 59 and 121, respectively.

Table 3.—Percentages of children in the study who received dental treatment between the time of the epidemic (June-Oct. 1946) and examination (Jan. 15-March 15, 1947), according to statement of parent or guardian

Group	Children examined	Statements submitted	Percentage that received fillings	Percentage that had teeth extracted
Case	264	197	32.5	22.2
Contact	464	405	30.6	24.8
Control	723	659	37.5	22.0
All	1,451	1,261	34.5	22.9

demic. To obtain some information regarding the differences between case, contact and control children in respect to dental care, parents were also asked whether "since the epidemic" the child had any new fillings inserted or teeth removed.

The following data obtained in the dental examination were recorded: the number of permanent and deciduous teeth (1) erupted and present, (2) containing untreated carious lesions, (3) filled, (4) indicated for extraction and (5) missing. Teeth indicated for extraction were those in which the pulp was visibly exposed or the crown destroyed beyond repair. Because of the natural loss of the deciduous teeth in the age range of the children studied, missing (extracted) teeth were recorded as such only in the event that they were part of the permanent dentition.

Results

Data pertinent to the purposes of this study are presented in Tables 1, 2 and 3 and Figure 1. The age distribution of the children in case, contact and control groups was roughly parallel, the median age in each instance being 8 or 9 years. The sexes were about equally represented throughout. Seventy per cent of the children studied gave histories of unbroken residence in Minneapolis and were distributed in like proportion (71.6, 74.6 and 66.5 per cent) among the three study groups.

Caries indices expressed by the number of carious, indicated for extraction, missing and filled (DMF) permanent teeth per 100 children or per 100 teeth of the respective dentition were not significantly different among case, contact and control children (Table 1). Carious, indicated for extraction and filled (def) deciduous teeth were distributed similarly in the study groups, but the number of children involved was reduced by the number who were older than 12 years. Such inconsistencies as were encountered are congruous with the relatively small number of children available in many age subgroups. Comparison of the numbers of teeth exhibiting exposed pulps or existing as residual roots also indicates essential agreement between case, contact and control children. Including both permanent and deciduous teeth, it was found that in any group approximately 1 per 100 teeth present, or between 20 and 30 per 100 children, were sufficiently destroyed to expose the pulp visibly.

Though the number of subjects was not large enough to permit entirely satisfactory subdivision, the case group was partitioned according to currently recognized clinical forms of poliomyelitis (Table 2). Designation of individual cases as bulbar, paralytic and nonparalytic is in conformity with records made available by the Minneapolis Division of Public Health and the University of Minnesota. No appreciable differences

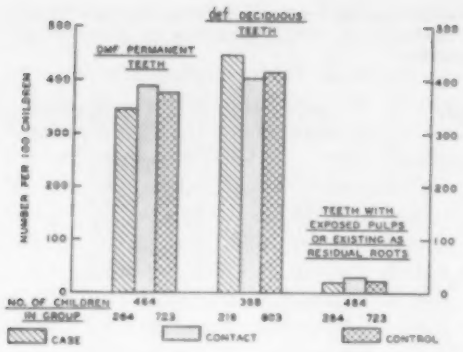

Fig. 1.—Dental caries experience of case, contact and control Minneapolis school children, aged 5 to 15 years

were discernible in the caries experience of either permanent or deciduous teeth, or in the number of teeth with visibly exposed pulps or existing as residual roots.

Discussion

Failure to demonstrate differences in the prevalence of exposed dental pulps between children who contracted poliomyelitis and those who did not is in agreement with the observations of Finn, Korns and Bahlke[13, 14] in this country, and Radden and Sandy[15] and Cameron[16] in Australia. In addition, no differences in caries experience were found in the present study.

The dental examinations were conducted during the first three months of 1947, several months after the poliomyelitis epidemic. However, the pattern of the progress of dental caries permits the presumption that the interim increment of caries experience would not obliterate group differences that existed during the epidemic. A characteristic of dental caries is that the total caries experience of a group is a measure of the tendency of that group to be attacked by caries. Should there have been significant differences in the amount or degree of dental caries between case, contact and control children at the time of the epidemic, it may be rationally assumed that similar group differences would be discernible four to six months later.

That the factor of dental treatment between the period of the epidemic and the dental examination is probably without influence in the comparison of the various groups is indicated by statements of parents and guardians submitted in behalf of 1,261 of the 1,451 (87 per cent) children studied. Real differences between case, contact and control children in respect to the percentages who received fillings or who had teeth, permanent or deciduous, removed during the epidemic or after it, would appear to be lacking (Table 3).[18]

Summary

Four to six months after the 1946 poliomyelitis epidemic, study of the teeth of 1,451 Minneapolis school children, aged 5 to 15 years, failed to indicate any relation of dental caries to clinical poliomyelitis. The subjects included 264 poliomyelitis patients, 464 household contacts and 723 control children. Intergroup differences were not observed in the number of carious, indicated for extraction, missing and filled (DMF) permanent teeth, in the number of carious, indicated for extraction and filled (def) deciduous teeth, or in the number of teeth exhibiting visibly exposed pulps or existing as residual roots. The suggestion that the dental pulp might be an important portal of entry for poliomyelitis virus in children is not supported by the results of this study.

18. The 1946 Minneapolis poliomyelitis epidemic aroused considerable public interest in the disease, its cause and its prevention. Observers on the scene at the time were of the opinion that only the most essential dental operations were attempted on the average child during the epidemic.

DENTAL PROSTHESIS IS DEFINITELY THE RESPONSIBILITY OF THE DENTIST

William W. Hurst, D.D.S., Cleveland

A DENTIST'S interest in a patient should cease on the extraction of the last tooth, and the prosthetic service should be rendered by a technician—essentially this is the inference that must be drawn from the paper McCall[1] read at a meeting of the American Association of Dental Schools. It goes without saying that this thought is revolutionary. To find a reason for such an unorthodox view, with its inevitable dire consequences, would beggar the imagination.

Perhaps it would be well to recount various circumstances that have led up to and are responsible for the belief, inferred from Dr. McCall's statement and expressed by others, that dentistry is too mechanical and that more emphasis should be placed on diagnosis and prevention.

Since its birth as an autonomous profession in 1840, dentistry has developed in eras, each with a different objective. Wilson[2] outlined the objectives motivating dentists in past, present and future eras, as follows:

1. Relief of pain—none other than a strong right arm;

2. Restoration of lost parts—apprenticeship methods of education to learn arts and crafts;

3. Elimination of infection (focal infection period)—knowledge of pathology, bacteriology, physiology, etc. (about this time we expanded our course to four years);

4. Control of dental disease (we are probably completing this phase)—a knowledge of etiology, mechanism of disease, beginnings of biological research;

5. Prevention of dental disease (we will probably witness and even take part in the transition into this phase)—broadening our research programs—improved understanding by our students of the basic biological sciences and development of public health thinking in our dental schools.

Dr. Wilson stated also:

In this evolution, dentistry has become the service equivalent of an oral specialty of medical practice. The relative, chemical inactivity of the hard tissues of erupted teeth, and the predominantly mechanical nature of their treatment, and the unique requirements of dental practice account for the separate professional status of dentistry.

Since 1840 there have been recurrent suggestions that a portion of dentistry should be converted into a specialty of medical practice and the chief mechanical phases of dentistry reserved for one or more auxiliary groups. In recent years it has been proposed that such partition of dental service—directly for the patient—be made analogous to the division of ocular health-care among opthalmologists, optometrists and opticians.

Advocate Training of "Superdentists"

Owre,[3] formerly dean of the College of Dentistry, University of Minnesota, and later dean of the School of Dental and Oral Surgery, Columbia University,

Read before the Academy of Dentistry, Pittsburgh, January 27, 1947.

Professor of prosthetic dentistry, School of Dentistry, Western Reserve University.

1. McCall, J. O., Dental Education in the Future as Influenced by Biologic Concepts. *Proc. Am. A. D. Schools* 21:137, 1944.

2. Wilson, G. W., Socio-Economics. *J. Am. Col. Den.* 11:219 (June) 1944.

3. Owre, Alfred, A View of Dental Education. *Minneap. Dist. D. J.* 5:42 (Sept.) 1922.

in his first announcement of the "master-servant" plan of dental practice, said:

> Ideally, dental education should branch off somewhere from the tree trunk of medical education, a tree which has for its roots preliminary training in mathematics, physics, biology, chemistry, a foreign language, and English composition. It should have the same relation to the parent stem as does the study of other regions, e.g., brain and nervous system, eye and ear, nose and throat, chest and heart, etc. The specialist in the oral-region should have the same standing as the specialist in any other region. His work is as essentially vital, involving vital tissue, and requiring thorough biological knowledge for its proper practice. This is the fundamental necessity—to train specialists in the mouth region, capable of diagnosing and prescribing for ills of the mouth. For the mechanical work involved in the care of the mouth it is possible to train men in much less time than is required for the oral specialist, and in much greater numbers. These men should work only under the direction of the oral specialist; and the latter should relegate the mechanical phases of oral treatment to the trained mechanic. It were as logical, to borrow an analogy from a noted scientist, to expect an eye specialist to make all glasses for which he writes prescriptions as to require an oral specialist to fill, clean, and otherwise mechanically treat all teeth his diagnosis finds faulty.

Owre's plan was to train "superdentists," with both M.D. and D.D.S. degrees, who would supervise fifteen or twenty men trained to perform only one operation, such as the construction of inlays, crowns or dentures—a so-called two-level plan of dental practice.

The Carnegie Foundation report[4] did not agree with Owre's plan. It said in part:

> Dentistry can be effectually and economically developed to the full service equivalence of an oral specialty of the practice of medicine through extension and improvement, in universities, of that system of dental education which, though separate from medical education, is closely related to it and should be more intimately associated with it.
>
> This extension and improvement could be accomplished without requiring the prospective general practitioner of dentistry to become a doctor of medicine before beginning his dental training.

The furor caused by Owre's pronouncement of 1922 had not fully subsided in 1932, when seven members of the Committee on the Costs of Medical Care, of which Owre was one, added the following footnote to the majority report of the committee:

> We commend the growing tendency in the practice of dentistry toward a division of labor in which a dentist who is also a physician assumes larger responsibilities for the diagnosis and treatment of conditions arising from or related to the teeth, while much of the routine performed by the dentist in the past is delegated to dental hygienists and other technicians working under his direction.

The same thought was contained in a footnote to a paragraph on dental education in the same report, in which six of the seven committee members expressed the desire that dentistry be made "a department of medicine and surgery" and suggested that "a variety of technicians could be trained, in shorter courses, for most of the routine work now performed in dentistry."

"Routines" of Dental Practice

An interesting comment[5] on the first-mentioned footnote follows:

> Ignorance may explain, but does not justify, a false or misleading statement. If the idea contained in the above footnote could legally be put into practice, the standards of dental education and those of dental health-service, which have continually advanced during the past century, and likewise oral health-service for the public, would be degraded. Dentists have spent their lives in developing and perfecting their ability and procedures in the

4. Report of Carnegie Foundation, 1924.

5. Correspondence and Comment: The "Master-Servant Plan" in Dentistry. *J. Am. Col. Den.* 2:188 (April-July) 1935.

"routine" practices of dentistry. Organized dentistry has continually directed its efforts to safeguard the oral health-service for the public by elevating the educational standards of the profession, and by securing adequate legislation to protect the interests of the public. The subscribers to the views in this footnote would tear down legal safeguards, supplant qualified dentists by charlatans, and debase oral health-service—all in the name of science and, presumably, for the advancement of oral health-service! This attitude is beyond understanding.

A statement with such potential dangers to the oral health of the public is unquestionably the result of lack of understanding of the nature, scope, and requirements of dentistry and the service it renders. It is difficult to understand why anyone familiar with the nature and requirements of the practice of dentistry would suggest such a division of labor and the proposed sharing of responsibilities with those not qualified to render an adequate oral health-service. Presumably, these members of the committee did not understand that the "routine performed by the dentist in the past" is the very cornerstone upon which the practice of dentistry has been founded. If this "routine" were taken away from dentistry, or delegated to unqualified persons, dentistry would cease to exist. This "routine" underlies, by far, the greater part of dentistry's service to the public. It is the excellence of these "routine," esthetic, bio-mechanical practices that has honored American dentistry throughout the world. Since leaders of American dentistry have found it advisable and necessary to elevate the standards for the practice of dentistry to insure an increasingly improved dental health-service for the public, how can any group, without a careful study of dentistry, recommend a change which fails to consider the fact that lowering the qualifications of those who serve the public cannot but lower the quality of the service which the public will receive? The assertion that "larger responsibilities for the diagnosis and treatment of conditions arising from or related to the teeth" contain two untenable assumptions: (1) the practice of dentistry is an irresponsible "routine" unworthy of the capabilities and knowledge of the physician-dentist and (2) "diagnosis and treatment of conditions arising from or related to the teeth" are beyond the scope of "routine" dentistry. The first assumption is refuted by even a superficial knowledge of the understanding, skill, and responsibilities associated with oral health-service; by the scientific advances in dentistry; and by the importance of the unsolved dental problems that challenge some of the most highly trained minds of the present day. The second assumption is likewise erroneous, as shown by the unprecedented advances in the study by dentists of biologic aspects of dento-medical problems, and by the widespread co-operation between dentists and physicians in the "diagnosis and the treatment of conditions arising from or related to the teeth."

There is not the least doubt that the members of the committee who signed this incredible footnote would be the first to complain of the low grade of dental work, if their recommendation were put into operation. The possibilities for commercialism and exploitation in dentistry would be unlimited if "technicians" were permitted to practice intra-oral phases of dental service. Under such conditions the technicians would at first gladly submit to the directions of professional overseers. Later, however, when their numbers had increased, they would break away from such restraints and, through legislation, secure the necessary license to conduct all of the intra-oral phases of dental practice. The history of the laboratory technicians in Germany illustrates what is likely to happen in America, if such a master-servant plan should become effective.

On January 4, 1935, the following statement appeared in the *New York Times:*

> Dr. Owre's life interest, it was said by a member of the family and a close friend, was to bring the general medical and dental professions into closer relations and to do away with dentistry as a separately organized profession. . . .

That Owre's philosophy made a deep impress on educators and philanthropic foundations is evidenced by the establishment by Harvard University in 1940 of a revolutionary plan of dental education, under an endowment supplied principally by the Carnegie Foundation. This plan, which offered the combined degree of D.M.D. and M.D., and which was to

include very little technical training in dentistry on the supposition that the medical training received by the hand-picked students would solve all dental ills, was abandoned in 1943.

The editor of the *Journal of the American College of Dentists*[6] commented as follows:

> Did the early official statements in behalf of the Harvard Plan . . . indicate its real purpose? Conditions attending the early announcements led many to believe that the plan was intended to initiate a "pioneer effort" to bring about, by indirection, the partition of dentistry into (a) a *mental* portion, to be made a specialty of medical practice ("dental medicine"), and (b) a *manual* portion, to be excluded from that specialty, but to be its technical supplement—the manual work to be done mainly by technicians.

The same editor[7] later commented that Owre in 1930, while dean of the dental school at Columbia, in a report to the president, favored resuscitation of the old "master-servant plan" and, through its agency, the partition of dentistry in such a way that most of the mechanical procedures of dental practice would be relegated to uneducated technicians working under the direction of physicians.

As an aftermath of Owre's influence, a plan of integration between the medical and dental schools at Columbia was inaugurated on July 1, 1945. Time alone will supply the answer to the query whether the plan was based on sound pedagogic principles. For the time being at least, the dental schools at Harvard and Columbia Universities are not on the list of acceptable schools as published by the Council on Dental Education. [Since the writing of this article, the Harvard School of Dental Medicine was fully approved by the Council on Dental Education, February 1948, as reported in the March 1948 issue of THE JOURNAL.—Editor.]

Considerable publicity was given to these suggested radical changes affecting the practice of dentistry, and groups outside the profession soon began to study and discuss the proposals in the light of their possible implications.

Some commercial dental laboratories and dental laboratory technicians were quick to attach significance to the role assigned them by the proposed unique division of dental practice. At the advent of the National Recovery Act (NRA) in 1934, the dental laboratory industry was codified as a separate industry and not as an adjunct to the profession of dentistry.

Attempted Licensure of Technicians

Studies of European systems of socialized medical and dental health services, conducted as a result of efforts being made in this country to bring the two professions under a compulsory health plan, revealed that dental laboratory technicians in some foreign countries were permitted by law to render intraoral as well as extraoral prosthetic service. This discovery, together with preachments along the same line being advanced from time to time in this country, gave stimulus to those of the dental laboratory trade who clamored for recognition. In 1935 the Committee on Dental Prosthetic Service[8] reported:

> There has been recurrent agitation among commercial dental-laboratory groups for statutory license for dental technicians, which led to the introduction of a bill in New York State, in 1923, to license the laboratory technicians as *"prosthetic dentists."* This bill was defeated. The laboratories of New York State, in 1929, succeeded in securing a law giving them licenses as *"Master Dental Technicians."* The law referred to them as *"practitioners,"* and was passed without the knowledge of the dental profession. Only by a tremendous ef-

6. Correspondence and Comment: More Light on the "Harvard Plan." *J. Am. Col. Den.* 10:225 (Sept.) 1943.

7. Correspondence and Comment: Further Comment on the Status of Oral Surgery. *J. Am. Col. Den.* 2:58 (Jan.) 1935.

8. Wright, W. H., Ad-Interim Report of the Committee on Dental Prosthetic Service: 1934-35. *J. Am. Col. Den.* 2:153 (April-July) 1935.

fort [on the part of the dental profession] was this law repealed.

Another unsuccessful attempt to enact a law licensing "master dental technicians" in New York State in 1938 shows the persistence of these efforts.[9]

The dental laboratory technicians of Illinois, in April 1939, introduced a bill into the Illinois State Senate "To Regulate Dental Laboratory Service" and license dental technicians. This bill was defeated after its first reading on June 24, 1939. Thus the fourth major attempt to obtain statutory regulation for dental laboratories and technicians ended, as did the preceding efforts, in failure.[10]

A much bolder attempt to obtain licensure occurred in the state of Washington. On February 1, 1941, the dental laboratory technicians had prepared and introduced into the state legislature a bill permitting dental technicians to practice all phases of prosthodontics, including such work as the taking of impressions and bites in edentulous and semi-edentulous mouths. The report on the final disposition of this bill is not available, but it is assumed that it was not reported out of committee.

Despite the reverses experienced by the dental laboratory associations in their fight for legislation to license dental laboratory technicians, there has been no appreciable lessening of the campaign. Why, one may ask, are the dental laboratories so insistent on licensure of technicians? Their stated purpose is twofold: They want the means to enforce regulation and control of the incompetent, financially irresponsible "hall room" type of laboratory owner, who is reputed to use poor materials, to cut prices and to offer a low grade of service; and they want to assist the dental profession in eliminating the illegal practice of dentistry, which they assert is perpetrated largely by this type of laboratory man.

Another point of view was expressed by Wright:[11]

It is to be doubted whether the real aim of technicians is law enforcement. Other motives lie behind the laboratories' concern over the violation (or is it violation?) of dental practice acts. Dental laboratories, in their own words, "have no desire to encroach upon professional territory." They want to "put the dental laboratory industry under strict state legislation, license all technicians, clearly define just exactly what a technician can and cannot do, and fix heavy penaties for anyone conducting a dental laboratory or doing a technician's work unlicensed." . . . That is an innocent-sounding statement; yet, in Italy, it succeeded in locking the dentist out of his own laboratory. . . .

Licensure of technicians is subversive of dentistry as it is now practiced. In its ad interim report in 1935 this committee [Prosthetics Service Committee, American College of Dentists] stated:

"A. Prosthetic dentistry, in both its clinical and laboratory practice, has been and continues to be a legal and an inalienable part of the practice of dentistry. Dentists are qualified by education, experience, and license to do all of the necessary laboratory procedures in the practice of dentistry, and to maintain proficiency in all accredited improvements of these procedures.

"B. The commercial dental laboratory has been utilized by dentists as a convenience.

"C. There are aggressive interests in the commercial dental-laboratory organizations that favor a change in the present unified status of dentistry which, if brought about, might open the way to further changes leading ultimately to the separation of prosthetic dentistry from dental practice, thereby lowering the quality of oral health-service below the accepted professional standards.

"D. Dentistry is fully cognizant of the oral-health needs of the public, and of the qualitative and quantitative aspects of the oral-health service which should be rendered under changing social conditions. The dental profession is undertaking to meet its expanding

9. Wright, W. H., Report of Dental Prosthetic Service Committee. *J. Am. Col. Den.* 6:104 (June) 1939.

10. Wright, W. H., Prosthetic Service: III. Illinois Technicians Sponsor Licensing Bill. *J. Am. Col. Den.* 7:219 (Sept.) 1940.

11. Wright, W. H., Prosthetic Service: II. Technicans Reply to Professon's Plea for Joint Study by Demanding Licensure. *J. Am. Col. Den.* 7:211 (Sept.) 1940.

social obligations while, at the same time, maintaining an effective system of production and distribution of oral health-service based on a sound professional concept."

Nothing has occurred since then to change the committee's views concerning the unity of the dental profession. We insist that the proposed licensure of technicians carries a threat against the unity of dentistry, especially if politically-controlled socialized or insurance dentistry should become a reality. This has happened in England and Germany and, no doubt, there are interests anticipating such changes in America.

Accreditation of Dental Laboratories

From the foregoing it can be seen that the American College of Dentistry is opposed to licensure of dental technicians. The American Association of Dental Schools has expressed similar sentiments. The American Dental Association does not look with favor on licensure of dental technicians, but favors instead accreditation of dental laboratories on a state level.

The following recommendations of the Reference Committee on Prosthetic Dental Service,[12] were approved by the House of Delegates of the American Dental Association:

(1) That every state appoint a prosthetic dental service committee at once, regardless of whether or not it will use the accreditation plan, in order that better dentist-laboratory relations may be developed and maintained; (2) that the Prosthetic Dental Service Committee of the American Dental Association have relations only with a truly democratic national laboratory organization which has a structure similar to that of the American Dental Association, and with its governing power arising at state level; (3) that certain principles contained in the report of the Prosthetic Dental Service Committee be considered when legislation is considered for the regulation of any dental laboratories in any state; (4) that a full-time secretary be employed to administer the program of the committee; (5) that opposition in principle to the licensure of technicians be maintained until further study can be made of educational and experience requirements for dental technicians; (6) that a study be made of setting up a laboratory organizational liaison committee workshop for the further study of these problems.

From the foregoing historical account of the important factors hanging over the future of dentistry, one must conclude that the dental profession has been challenged. Members of the profession, no less, have seen fit to bargain away its birthright. Others outside the profession want to share in its ministrations.

Dentistry as a profession celebrated its one-hundredth anniversary in 1940. Its noble heritage should be an inspiration to everyone to rally to its defense and carry its banner toward goals of greater and greater achievement.

Dentistry's Nondentist Friends

That dentistry has friends is evident from the quotations that follow. Eliot,[13] president emeritus of Harvard University, in an address to dental students, included the following comment:

I want to congratulate you on the greatly improved standing of the dental profession among the professions. That is one of the most striking changes in public opinion that I have witnessed during my seventy years of observation of educational progress. . . . I do not think I have seen during my seventy years of observation of the professions and the means of training them any change so great as that which has taken place in regard to the dental profession, and to the means of training dentists. . . . The training a dentist needs is in large part a training in skill of eye and hand. It happens that in acquiring the skill he needs, he must learn to perform with a high degree of skill a great variety of manual and bodily labor. . . . I believe this school [Harvard] acts on the belief that if a young man cannot acquire the necessary skill of eye and hand, then he cannot become a good dentist. . . .

12. Summary of Activities of House of Delegates, Miami, October 14-16. *J.A.D.A.* 33:1495 (Nov. 15) 1946.

13. Elliot, C. W., cited by Gies, W. J., The Import of the Prospective New Dental Program at Harvard University. *J. Am. Col. Den.* 7:350 (Dec.) 1940.

Look forward, therefore, to the future of your profession with great hope.

Van Beuren,[14] while associate dean of the Columbia University College of Physicians and Surgeons, spoke as follows at an annual meeting of the Association of American Medical Colleges:

Medicine and medical education have troubles of their own which will not be alleviated by attempting to swallow whole another profession: a profession which, by and large, does not want to be engulfed. And a profession like dentistry, with a hundred year history, deserves to have its feelings considered. You may call dentistry a specialty of medicine, but that does not make it so: and it is none the less valuable for that fact.

I can see no reason why the degree, Doctor of Dental Surgery, honestly held and honorably upheld, should not in the future deserve equal respect and esteem from the public with the degree of Doctor of Medicine, provided it is held by a similar type of man. And whatever their future relationship may be, let medicine and dentistry now go forward side by side as friendly collaborators in the estimable undertaking of offering help to those who need it and adding to the happiness of life as much as to the length of its span.

Marriott,[15] dean of the Medical School of Washington University, St. Louis, shortly after the recent erection of the new building for that university's associated dental school, published this comment:

Nothing is to be gained by converting a first-class dentist into a mediocre medical practitioner. . . .

I do not believe it is practical to unify the dental and medical curricula so as to provide for the same training of dentists and physicians during any considerable part of their academic careers. . . .

Dentistry is a very specialized field of medicine which has already been elevated to a standard of professional excellence entirely comparable with that of other medical specialties. The average American dentist is at least as well qualified to render adequate service in his field of work as is the average otolaryngologist, ophthalmologist or surgeon. Dental education in America has been notably effective, and that is to the credit of the profession. . . . Changes should not be made at the expense of that which has been found good through long practical experience. . . . I am . . . entirely unconvinced that any plan for the unification of the dental and medical curricula would result in the training of better qualified dentists. Dentistry is a profession which has become firmly established in its own right, and one which comprises a number of specialties. It would lose much by becoming a subdivision of medicine. It had best retain its independence.

The following statement from an address by Capen,[16] chancellor of the University of Buffalo, at an annual meeting of the American Association of Dental Schools, is of interest:

In recent years, some persons have believed that it would be both possible and desirable to merge dentistry with medicine. A few leaders of the medical profession have thought so. Even a few leaders in dentistry have held the same opinion. From the point of view of logic, it is an attractive thesis. . . . The body is a single biol ic unit and the mouth is a part of it. Why should there be two separate professions, each concerned with a fraction, large or small, of the total organism? So runs the logical argument.

In spite of logic, however, I am persuaded that the two professions will not be merged in America within any period of time that we can now foresee, perhaps never. Dentistry is too firmly entrenched. The members of the profession are too numerous. It has won standing with the general public. It has too heavy an investment in schools for the preparation of future practitioners. It has imbued its members with so ardent a guild loyalty that the vast majority of them would tolerate no suggestion which would impair the complete independence of their calling.

14. Van Beuren, F. T., Jr., Dentistry: The Errant Branch. *J. D. Res.* 12:239 (April) 1932.

15. Marriott, W. M., Comment on the Status of Dentistry. *J. D. Res.* 11:807 (Oct.) 1931.

16. Capen, S. P., The Place of Medical Sciences in Dental Education. *J.A.D.A.* 29:1065 (June) 1942.

Changing Concepts

With the material presented thus far, an effort has been made to show the origin and existence of changing concepts relating to the practice of dentistry and dental education and the implications of these concepts, as viewed by different persons within and without the profession.

That McCall's articles[1, 17] were based in part on these changing concepts there is little doubt. Several quotations from his articles are of interest. He wrote:[17]

> Stillman has, over the past ten years, attempted to turn the thoughts of dentists to the biologic, what we may call the "life" aspects of dental problems as contrasted with those things that relate to the inanimate or restorative phases of dentistry. He truly states that if dentistry is in fact a branch of the healing art coequal with the recognized specialties of medicine, a fact proclaimed by Gies nearly twenty years ago, it should focus the attention of dentistry on those things that have life, that have resistance and recuperative power, as well as susceptibility to the diseases with which dentists are daily confronted.
>
> This is the underlying theme of my paper —that the teeth as well as their surrounding tissues are vital and a part of the living body. It follows that to keep the teeth in the mouth and in a healthy condition is the chief concern of the dentist. As a corollary, I propose the thought that when the teeth succumb to disease and are extracted, there should logically be a diminished interest displayed in them by the dental physician; that essentially his job terminates when the natural teeth have been lost. . . .
>
> While the filling and the full denture have in common the fact that they are inert substances, the product of purely mechanical procedures, they differ widely in a very important respect, in that the filling is ordinarily placed in a vital tooth and this vitality must be respected throughout the procedure of cavity preparation and in inserting and finishing the filling. The procedure is a biomechanical one.
>
> On the other hand, the full denture, although resting on vital mucous membrane, presents no such problems in regard to vitality. Its construction and even its adjustment are matters entirely in the realm of mechanics, with, of course, suitable consideration for esthetics.

Again,

> In the field of prosthetics, the student's main attention would be given to crown and bridge prosthesis. Here he would be taught the most useful techniques and would gain insight into the requirements of balanced or functional occlusion, requirements of form and color for esthetics, et cetera. Obsolete forms would be eliminated. Saving of time would come chiefly in the full and partial denture field. Here the total laboratory and clinical requirement would be cut by allocating processing techniques, except for demonstration purposes, to laboratory technicians. Impression techniques, bite registration and adjustment of finished dentures would be taught, but requirements would be kept at a minimum consistent with providing an understanding of principles. . . .
>
> While it was my intention, in presenting this paper, to give my attention mainly to the training of the dentist himself, I cannot regard the social objective of dental education as being satisfied at that point. For the dental practice of the future I have advocated the training of dental hygienists to place amalgam and other plastic fillings in children's teeth, as well as to do prophylactic treatment and carry on health education programs. . . .
>
> Similarly, I have advocated the training of dental technicians to carry on the oral as well as the laboratory phases of full and simple partial denture work.

And again,[17]

> There is another point of view that should be discussed in considering dental practice of the future; that is, the attitude of medicine toward dentistry. Dentists sometimes complain that physicians are not interested in dental problems. It is true that they are not interested when they are asked to look at those problems as the dentist usually views them. On the other hand, it is relatively easy, I have found, to interest physicians in the same problems if presented in terms of why the various diseases occur and how they can be prevented.

17. McCall, J. O., Dental Practice and Dental Education in the Future: With Consideration of Social and Health Aspects. *J.A.D.A.* 31:16 (Jan. 1) 1944.

Another angle to this problem of medico-dental relations is the difficulty, amounting almost to a barrier between the two professions, which arises, I am sure, from the part prosthesis plays in dental practice. The physician recognizes instinctively that dental prosthesis comes into the picture after life, so to speak, has gone from the affected part of the body. Even in the filling of vital teeth, he finds himself somewhat baffled by the obvious mechanistic basis of procedure. For these reasons, he finds it difficult to reach a common mental meeting ground with the dentist. I predict that dentists will never be accepted by physicians as health workers on an equal basis as long as they continue to be preoccupied with prosthesis as at present and to exalt this phase of practice.

To illustrate my point, let me cite a comparable situation in the medical field and the usual way of handling it, the case of traumatic injury of the leg. The surgeon applies such therapeutic measures and agencies as are indicated in an effort to save the leg and restore its function. If such efforts are beyond the possibilities of success, he performs an amputation. After recovery, a wooden leg is made. Is the wooden leg made by the surgeon? Not at all. There is no therapeutic problem involved in that procedure, only restoration of function as far as possible. Hence the case is turned over to the trained technician. If adjustments are needed, the surgeon will advise regarding them.

Assertions of McCall Answered

That the assertions of McCall did not go unanswered is evident from the following resolution, adopted by the American Association of Dental Schools:[18]

Whereas there has recently been brought to the attention of the dental profession a tendency to assign certain types of dental service to those trained at subprofessional levels; and

Whereas prosthetic dentistry has been frequently mentioned as one of those dental services that could be supplied on a subprofessional level; and

Whereas traditional teaching and practice of restorative dentistry has been conducted on a high scientific level; and

Whereas it has been conclusively demonstrated in practice and research that competent prosthesis can be rendered only by those properly trained in the biologic and physical sciences; therefore be it

Resolved that the section on Dental Prosthesis of the American Association of Dental Schools in session at the annual meeting held in Chicago, Ill., March 21, 1944, vigorously protests this easy assumption that dental prosthetic service can be relegated to persons untrained in the biologic and physical sciences; and be it further

Resolved that this Section place itself on record in the transactions of the American Association of Dental Schools as condemning this concept as detrimental to the health and welfare of the public and to the dental profession.

In an attempt to assign causes for the disturbing elements facing dentistry today, several factors seem worthy of consideration:

1. The feeling on the part of many physicians, dentists and educators that dentistry is too mechanical and not based sufficiently on biologic science;

2. The opinion held by many physicians, dentists and educators that more time spent on research and less on mechanics would solve dentistry's problems of tooth decay, periodontoclasia and other diseases of the oral cavity;

3. The problem of supplying dental care to the 80 per cent of the population not now receiving it, linked with the shortage and unequal distribution of manpower;

4. The new philosophy of life (any change is better than the status quo) engendered by two world wars, a depression and the New Deal in government;

5. The tendency on the part of dentists to assign as much work as possible to auxiliary personnel, in order that they may (a) serve more patients by devoting all their time to chair service, (b) avoid extraoral mechanical procedures because

18. Resolution Protests Changes in Dental Prosthetic Service. *J.A.D.A.* 31:591 (April 15) 1944.

of dislike for them, (c) increase income and (d) delegate more and more work to commercial laboratories on the urging of dental laboratory salesmen;

6. The rise in importance of commercial laboratories—dentists becoming more and more dependent on their services—and the desire on the part of some laboratories for legislation permitting technicians to perform oral and extraoral phases of prosthesis.

Dentistry is an oral health service based on biologic and physical sciences. Criticisms that the practice of dentistry is too mechanical and not sufficiently based on biologic sciences are unwarranted. It is true that a large part of dental practice is of a mechanical nature, but it is true also that these mechanical procedures are performed with respect to and in conformity with biologic concepts. That the dental profession is fully cognizant of the importance of research in relation to the causes of dental diseases and the alleviation of their effects is evident from the large number of research programs now under way in many of the country's dental schools and universities.

The problem of making dental care available to the entire population involves the training of more dentists, a better distribution of dentists geographically, more efficient office practice and the use of auxiliary personnel. Any attempt to solve the problem of serving the 80 per cent of our population who do not now receive regular dental attention by lowering the standards of dental education or by placing dental service on two different levels should be resisted to the utmost.

Use of Auxiliary Personnel

The use of such auxiliary personnel as dental assistants, hygienists and dental laboratory technicians is highly desirable, providing the work of these aids is done under the supervision of the dentist and the services performed do not exceed those permitted by law.

The following quotation from an article by Gies[19] is of interest:

> The boundary between dental practice and technical assistance may be indicated by the statement that a technician may lawfully perform any cooperative act *outside* of the mouth that would aid a dentist to conduct a procedure of legitimate dental practice *within* the mouth. It is obvious that a practitioner who, in prosthetic work, takes accurate impressions, does all of the preparatory work with a patient, and correctly idealizes, designs, plans—and biologically and esthetically evaluates and adjusts—an appliance, need not be his own executant of the extra-oral procedures, but may properly obtain the help of technicians in the purely mechanical aspects of this work. In fact, where he can devote practically all of his working time to intra-oral care for his patients, it would be a waste of his more valuable talent and time in direct health-service if he did not obtain such assistance for this purpose.

Wright,[20] in the report of the Committee on Dental Prosthetic Service of the American College of Dentists, referred to "laboratory phases of denture prosthesis." He wrote:

> Generally speaking, the dentist prefers to do the important part of the work himself and to send only the purely technical part to a commercial dental-laboratory. However, the dentist who is not particularly interested in prosthesis prefers to send every possible step to a laboratory, and to devote his time to that part of dental practice which he most enjoys. Such practices invariably lead to a low grade of prosthetic service.
>
> The importance of dental prosthesis in relation to the health of the public is such that there can be no division of the responsibility for denture service between the dentist and the dental technician. Only the dentist is legally responsible for every detail in rendering this

19. Gies, W. J., Relation of Dentists to Technicians and Commercial Dental Laboratories. *New York J. Den.* 8:180 (May) 1930.

20. Wright, W. H., Dental Prosthetic Service. *J. Am. Col. Den.* 3:60 (March-June) 1936.

service, and the transfer of any responsibility whatsoever is contrary to custom and professional ethics, and a violation of the law. It is evident, therefore, that the sharing of that responsibility with commercial interests would ultimately lead to dissatisfaction, and bring reproach upon the dental profession.

In dealing with this problem, a quotation from the Report of the Curriculum Survey Committee[21] offers the following information:

There is an erroneous idea among some members of the profession that the laboratory procedures of restorative work can be delegated, in their entirety, to a fairly-well trained dental mechanic in a commercial dental laboratory. Unfortunately this concept has led to the common practice of sending dental restorations out of the dental office into a commercial dental laboratory where, frequently, they are constructed by technicians with no knowledge of the part that restorations will ultimately play in maintaining the health of the patient. The situation is further complicated by the nature of such laboratories which, owing to their commercial character, regard profits as the criteria of success. This practice has misled the profession into a loss of interest and skill in the laboratory phases of the work, has played into the hands of commercial interests, and has done much to degrade the practice of dental prosthesis. Many practitioners have neither conceived dental prosthesis in its proper light nor lived up to the ideals of this service. They have lowered the quality of their professional services by accepting, against their training and better judgment, the standards of commercial organizations that are not inspired by the professional attitude. Moreover, the practice of restorative dentistry, particularly dental prosthesis, has been much exploited by commercial interests and at times grossly betrayed by selfish groups both within and outside the profession. This commercial degradation of dental prosthesis is of great concern to those members of the profession who conceive the promotion of the health, comfort, and happiness of the people as the most important function of the dental profession. Owing to these influences dental prosthesis is at present in a somewhat uncertain position, and its very perpetuity on a professional basis is threatened.

Laboratory Technicians in Dental Schools

Another dangerous practice is the employment by some dental schools of dental laboratory technicians to carry on the laboratory phases of partial and complete denture prosthesis for the students' clinical cases. Several schools argue that if a graduate is going to have all his prostheses made in a commercial laboratory when he opens his office, he should be given the opportunity to learn the proper dentist-technician relation while he is a student.

It is gratifying to know that one state, Pennsylvania, has seen fit to disapprove the employment of dental laboratory technicians in a dental school. Wright[22] reported:

At a meeting of the Dental Council and Examining Board held in Harrisburg on August 3, 4 and 5, 1941, the following motion was unanimously adopted:

"The Dental Council and Examining Board of the Commonwealth of Pennsylvania does not approve of dental schools engaging technicians or permitting dental students to engage technicians to perform any practical or technical work assigned to them for credit leading to a degree. This applies to work performed in the dental school or outside of the dental school."

This action of the Pennsylvania Dental Council and Examining Board opens the way for a discussion of the complications arising from the use of dental technicians in any capacity in the present educational program.

Dental technicians, while regarded as adjuncts by the dental profession, insist that they are an industry and, in some states, have allied themselves with trade unions. The unionization of technicians, together with the fact that they are neither formally trained in dental schools nor licensed by the state, raises the question as to whether or not the use of technicians by dental schools is in keeping with the present standards of dental educa-

21. Report of Curriculum Survey Committee of the American Association of Dental Schools, cited by Wright.[20]

22. Wright, W. H., Prosthetic Service: 6. Pennsylvania Dental Council and Examining Board Disapprove the Use of Dental Technicians in or by Dental Schools. *J. Am. Col. Den.* 9:211 (June) 1942.

tion and consistent with the exacting requirements for students of dentistry. From the scholastic point of view, it is inconsistent to delegate to unschooled and unlicensed dental technicians those technical procedures which a student must learn in course and on which he must be examined by the State Examining Board before he can become a licensed practitioner. . . .

The employment of dental technicians by dental schools is the highest compliment that can be paid to the technicians and the strongest recommendation for the patronage of dental laboratories. Employment of technicians by dental schools implies, as technicians have repeatedly said, that they know more about the laboratory procedures than do the dentists, consequently, dental teachers must employ technicians to learn how to do modern laboratory work.

Illegal Use of Laboratory Technicians

That some dentists lean heavily on the dental laboratory technician, not only for aid in purely extraoral technics, but also for assistance in intraoral procedures, is attested by the following resolution from the Report of the Committee on Professional Relations, North Carolina State Dental Society:[23]

Inasmuch as the following practices are derogatory to a high grade oral health service to the public, unfair to dental technicians, and contrary to the obligations and responsibilities implicit in the license to practice dentistry; therefore, be it resolved that they shall hereafter be proscribed by this Society as unethical, subversive of professional ideals, and unworthy of the sanction of the dental profession:

1. The use of a dental technician by a dentist to assist in performing, or to perform intraoral dental operations, or related technical procedures upon the patient.

2. Misrepresenting, to the patient, the true identity of any non-dentist technician or assistant by introducing him as a "denture specialist," or by calling him "doctor" or any other title that would lead the patient to believe that the assistant or technician is legally qualified to render such dental service.

3. Directing, sending or taking a patient to a dental technician for the purpose of having the technician perform any intraoral and extraoral dental operation or procedure of any nature, as for example, making impressions, making jaw relation records, selecting artificial teeth, repairing dentures, etc.

4. Cooperating in any manner with a dental technician so as to aid him in serving the public directly.

When the dentist realizes the numerous conditions that are threatening the practice of dentistry, he naturally is seriously disturbed and wonders what he can do about it.

Of all the problems facing the profession today, the one that seems to require the most immediate attention concerns the dentist's proper use of the services of the laboratory technician. The technician is here to stay. His service has been, and will be, helpful in a proper dentist-technician relation. Without doubt, the ideal arrangement is that in which the dentist employs a technician in his own office. Here, close supervision by the dentist of the work being done by the technician is possible. If a dentist does not have sufficient work for a technician, often an arrangement may be worked out whereby two or three dentists in the same building share the technician's services.

The use of commercial laboratories is fairly satisfactory but, because of the size of most of these establishments, personal service is usually lacking. As was mentioned earlier, there is a growing tendency on the part of dentists to assign more and more of the technical phases of prosthetic and other types of dentistry to the technician. The reason given by dentists for turning this work over to laboratories is that they are too busy to do this work themselves.

Most dentists will admit that the most lucrative part of their practice is partial and complete denture prosthesis. Though

23. Report of Committee on Professional Relations, North Carolina State Dental Society. *Bul. N. Carolina D. Soc.* 24:73 (Aug.) 1940.

the fee charged for a complete set of dentures is equivalent to that charged for 20 compound amalgam restorations or 10 two-surface inlays, the office time spent on these dentures, including impressions, centric registration, try-in of setup, adjustment of dentures and one or two treatments, does not exceed three hours. This abbreviated denture service is inferior to the service that the dentist could render were he to devote the amount of personal attention to each patient that the denture fee justifies.

Dental laboratories are, to a great extent, responsible for the present situation with respect to prosthetic service. They are telling dentists to make partial dentures instead of bridges and to do fewer and fewer of the steps in denture work.

More time spent on the various phases of prosthesis, such as a careful examination of the mouth, the selection of an impression technic that is suitable for the individual mouth, the determination of a proper denture space (vertical dimension), accurate registration of centric relation, selection of teeth, arrangement of teeth by the dentist (at least the twelve anterior teeth) and careful adjustment of completed dentures to the mouth, would result in a high type of denture service. A return to more thorough methods of prosthetic service and less dependence on technicians for help and advice will do much to discourage dental laboratory personnel from attempting to usurp this important phase of dental practice.

Conversation with dental laboratory men reveals that in placing orders for partial and complete dentures, most dentists give the technician carte blanche. If dentists are desirous of retaining denture prosthesis as a part of their practices, they must equip themselves through refresher courses and postgraduate training to design partial and complete dentures so they will be able to issue proper instructions for their fabrication.

The responsibility for denture prosthesis rightfully belongs to the dentist. Let dentists fulfill their obligation through an intelligent application of the principles they have learned as professional men.

The following statement by Gies,[24] who is not a dentist but nevertheless is one of dentistry's best friends, merits the wholehearted approval of dentists:

> I respect dentistry as one of the most useful, effective, and desirable agencies for the promotion of comfort, health, and welfare. I admire dentistry for its nobility of purpose; its efficiency in procedure; its value in achievement; and its progressive effort, through self-examination and self-criticism, continually to make itself better and more serviceable. My appreciation of the dental profession as it exists today, my faith in its future, my wish for its cumulative support, and my desire to see it fully esteemed everywhere at its true value, are among the sentiments that hold my abiding active interest.

24. Gies, W. J., Discontent: Stimulant or Depressant? *J. Am. Col. Den.* 10:223 (Sept.) 1943.

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Cost of National Health Service in Scotland.—An increase of £5,655,000—more than £1 a head of the population—to £22,905,000 for the year 1948-9 in the cost of the National Health Service in Scotland is shown in a White Paper of Supplementary Civil Estimates issued on February 10th.

The original estimate of £1,000,000 for general dental services has been increased by £1,800,000. The estimate of £10,000 for expenses of the Scottish Dental Estimates Board is being raised by £30,000. Of this, £22,000 is required for salaries and wages, including the remuneration of members of the Board. The remaining £8,000 is for "incidental expenses." It is interesting to learn that at least a portion of these astronomical sums is not going into the pockets of the general practitioners.—*"Scottish Health Service Notes," D. Gazette 15:346, March 1949.*

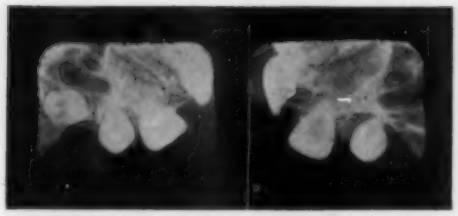

Fig. 3.—Left and right maxillary occlusal roentgenograms. The roots of the four anterior teeth were extremely short; the central incisors, in fact, were loose

side appeared to penetrate to the surface of the bone at the crest of the alveolar ridge. The roots of the erupted central incisors and cuspids were extremely short (Fig. 3). This condition played an important part in the final treatment.

Treatment

The form of treatment was selected only after careful study of all the factors involved. First, it was decided by the oral surgeon in charge that no further surgical intervention should be attempted at the time because of the danger of exciting further carcinomatous growth. This decision, of course, eliminated the possibility of a plastic operation to improve the appearance and also of reconstruction of the lower alveolar ridge to aid in the wearing of a denture. The oral surgeon suggested the construction of prosthetic appliances over the unerupted teeth, with the thought that if and when these teeth should erupt, the appliances could be reconstructed to conform to the new situation.

Second, it was thought that better looking dentures might be constructed if orthodontic treatment were used to move the central incisors into closer approximation. However, the shortness of the roots precluded this possibility. It was decided that such movement would decrease the usefulness of the teeth as abutments to retain a partial denture and therefore that upper and lower dentures should be constructed without any attempt to alter anatomic conditions.

A lower full and an upper partial denture were constructed, the upper partial with a full acrylic palate, supplying two bicuspids on either side and a central incisor between the patient's own central teeth. Because of the short maxilla, there was room for only the bicuspids posterior to the patient's cuspids. The acrylic incisor in the midline was constructed to aid in the retention of the upper denture. The acrylic material was cut away around the cuspids to allow for further eruption of these teeth, and the patient was warned to return at the first indication that additional teeth were erupting. The lower denture was constructed to cover all available ridge area without impinging on movable tissue. Owing to the high attachment of the labial tissue, there was almost no flange in this area.

The most difficult step in the procedure was obtaining impressions. The final lower impression was taken with the jaws in centric relation. Squeezing upper and lower bite rims filled with impression paste past the patient's taut lips was indeed a chore.

The dentures were processed by the usual procedure, with an acrylic central incisor as planned in the midline of the

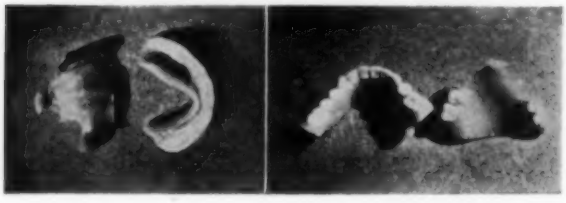

Fig. 4.—Upper and lower dentures completed in acrylic

upper denture. This tooth was designed primarily for retention and not for esthetics. Figure 4 shows both dentures completed. Figure 5 provides a front and a profile view of the patient with the dentures in his mouth and intraoral views of the patient with and without the dentures. The color of the acrylic central tooth was much too light and had not been changed at the time the photographs were made.

The dentures required a minimum of adjusting after delivery, and the few sore spots that developed were due mainly to overextension. When the patient was last seen, some five months after delivery of the dentures, he reported great improvement in his ability to masticate food. He readily became adept at manipulation of the dentures and felt self-conscious when they were out of his mouth. At this time there was no indication of eruption of additional teeth.

Fig. 5.—A and B, profile and frontal views of patient with dentures in place; C, intraoral view of patient when first seen for treatment; D, intraoral view of patient with dentures in place

Discussion

Since an accurate dental history was not kept before the patient's admittance to the clinic, it is interesting to postulate the reasons for absence of the teeth. Probably the portions of the teeth already calcified at the time of irradiation were not affected to any appreciable degree. However, those portions of the developing teeth not imbedded in calcium salts undoubtedly were affected extensively by the roentgen therapy. This conclusion receives support from the stunting of the roots of the remaining teeth and the presence of dwarfed molar-like crowns near the angles of the mandible. Rushton[1] recorded similar conclusions. It may be that many of the teeth in the mandible developed, erupted and then became loosened and required extraction because bony support was lacking. It may be possible that the marked retardation of the general bodily growth of the boy was due to extensive irradiation of the pituitary gland. At any rate, one may conclude that heavy doses of roentgen radiation were extremely detrimental to the normal development of the patient's face, jaws and teeth, and possibly to his entire body, although the treatment saved his life.—*725 North University Avenue.*

1. Rushton, M. A., Effects of Radium on the Dentition. *Am. J. Orthodont. & Oral Surg.* 33: Sec. Oral Surg. 898 (Dec.) 1947.

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Economic Influence of Accidents.—Accidents in the United States each year cause approximately 100,000 deaths and result in the permanent or temporary disablement of about 10,000,000 persons. Numerically accidents represent the fourth most important cause of death. However, from the point of view of economic drain on the country and loss of productivity for which they are responsible, accidents can actually be considered as the most important cause of death since they generally claim their victims at a younger age than do the major chronic diseases—cancer, heart disease, and cerebrovascular diseases.—*Donald B. Armstrong, "Accident Prevention," Pub. Health Rep. 64:355, March 25, 1949.*

TEN "MUSTS" IN PLANNING FOR DENTAL HEALTH

Kenneth A. Easlick, D.D.S., A.M., Ann Arbor, Mich.

If 146,000,000 persons seriously demand a broader distribution of good oral health care in this country, 78,000 dentists can offer only futile resistance to the social changes which appear certain to follow. But 78,000 scientific, thoroughly informed, cooperative dentists can do much to direct constructively the changes which will affect the practice of dentistry.

The following "musts," five for the public and five for dentists, would seem to assure the basis for a sound dental health program planned with close cooperation and with mutual regard by public and dentists each for the other's point of view:

"Musts" for the Public

1. The public must understand the dislike of the dental profession for and its fear of regimentation by government. It must appreciate that since 1910, when Hunter of England condemned American dentistry for its contribution to ill health, what was then a small mechanical profession has pulled itself up, literally by its own bootstraps, to become a scientific dental health profession. With this improvement in the status of dentistry have come many scientific health practices that were not taught in dental schools when many dentists now practicing were students.

2. The public must appreciate that dentists have shown willingness to cooperate in community health planning when they have not been snubbed and when their planning has not been done for them by nontechnical persons.

3. The public must assume the financing of one of the largest and most expensive types of health service so far attempted—that is, if parents are serious in their desire for optimal oral health for their children. Parents not only must finance the program but must remove some of the blocks—fright on the part of children, refusal of schools to excuse them for dental appointments and the demand for half charges for children's fillings.

4. The public must understand that the country's present dental manpower is inadequate for the job uninformed planners propose, lest it be stampeded into voting for programs impossible to achieve. It must become reconciled to an initial expansion of dental care for children, who do not vote, and a postponement of expanded services for adults, who do vote.

5. The public must appreciate that until easily administered preventive or public health technics are provided and validated by research, early, regular dental care is the most economical and efficient technic available. Topical application of sodium fluoride solution and restriction of intake of fermentable carbohydrates, it is true, are partial controls of caries, and there is considerable evidence that addition of fluoride to communal water supplies and use of an ammonia-liberating dentifrice with a synthetic urea mouth wash will be found helpful. But accidents to young teeth

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appear to be increasing; the scrambling of racial characteristics in America's "melting pot" makes occlusion worse, and interest in the control of periodontal disease gains. No dentist need fear that present and pending research can do away with his practice if he cares to treat the primary, mixed and permanent dentitions of children and to preserve the supporting tissues of adults.

"Musts" for Dentists

1. Dentists must learn to appreciate that practice among children is a highly satisfactory occupation when practitioners work as diligently to master the modifications of its technics and to diagnose and control the problems of childhood health, growth, development and exchange of dentitions as they do to master the technics of prosthetics or of minor oral surgery.

2. Dentists must see that children no longer are turned away from dental offices as undesirable patients. If dentists do not wish to treat children in family practice, it appears sensible to turn the job over to local health departments, with committees or health councils of local dental societies responsible for setting up policies and standards and perhaps supplying some professional supervision. Dentists should ponder this alternative well, however, before they decide to limit themselves to treatment of adults.

3. Dentists must heed the social trends, which indicate that a demand for an adequate dental health program for children will have to be met first in any nationwide extension of dental care, and must prepare themselves accordingly. They should support and build up a strong bureau of public health dentistry in each state, with trained personnel to gather data on which the profession can base intelligent plans for the future. This bureau should assume leadership in providing opportunities for dentists to inform themselves thoroughly about the extent of the state's dental problem. It should administer scientifically any public dental program that has been developed in cooperation with the dentists of the state and it should support dentists to the same degree to which dentists support the bureau.

4. Dentists must realize that the public does have a stake in the practice of dentistry and must learn to respect the public point of view. In matters involving the art and applied science of dentistry, the dentist is the sole authority; in economic aspects of the dental health problem, however, as well as the administrative aspect, the people have equal rights and equal concern. How much dental care will cost, how the consumer will pay for it, in what form it should be offered—these are becoming matters of interest to the public as well as to dentists. The interest of the public can become disturbing. The demands of organized labor for health programs furnish illustrations of the growing size and strength of this interest. One economist, indeed, predicted more than a year ago that, barring another world war, a modified national health bill of the Wagner-Murray-Dingell type eventually would pass Congress with the support of both the American Medical and the American Dental Association, because both groups would become thoroughly frightened of the unions' demands.

5. Dentists must recall that what is probably one of the harshest laws of nature still operates: that there is no surer road to extermination than failure to adapt to a changing environment. It is doubtful that dentistry long can maintain its position as an independent health profession in a security-minded nation while supplying its services to only 20 or 25 per cent of the people—including even a smaller percentage of the people's children.

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The following "musts," five for the public and five for dentists, would seem to assure the basis for a sound dental health program planned with close cooperation and with mutual regard by public and dentists each for the other's point of view:

"Musts" for the Public

1. The public must understand the dislike of the dental profession for and its fear of regimentation by government. It must appreciate that since 1910, when Hunter of England condemned American dentistry for its contribution to ill health, what was then a small mechanical profession has pulled itself up, literally by its own bootstraps, to become a scientific dental health profession. With this improvement in the status of dentistry have come many scientific health practices that were not taught in dental schools when many dentists now practicing were students.

2. The public must appreciate that dentists have shown willingness to cooperate in community health planning when they have not been snubbed and when their planning has not been done for them by nontechnical persons.

3. The public must assume the financing of one of the largest and most expensive types of health service so far attempted—that is, if parents are serious in their desire for optimal oral health for their children. Parents not only must finance the program but must remove some of the blocks—fright on the part of children, refusal of schools to excuse them for dental appointments and the demand for half charges for children's fillings.

4. The public must understand that the country's present dental manpower is inadequate for the job uninformed planners propose, lest it be stampeded into voting for programs impossible to achieve. It must become reconciled to an initial expansion of dental care for children, who do not vote, and a postponement of expanded services for adults, who do vote.

5. The public must appreciate that until easily administered preventive or public health technics are provided and validated by research, early, regular dental care is the most economical and efficient technic available. Topical application of sodium fluoride solution and restriction of intake of fermentable carbohydrates, it is true, are partial controls of caries, and there is considerable evidence that addition of fluoride to communal water supplies and use of an ammonia-liberating dentifrice with a synthetic urea mouth wash will be found helpful. But accidents to young teeth

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appear to be increasing; the scrambling of racial characteristics in America's "melting pot" makes occlusion worse, and interest in the control of periodontal disease gains. No dentist need fear that present and pending research can do away with his practice if he cares to treat the primary, mixed and permanent dentitions of children and to preserve the supporting tissues of adults.

"Musts" for Dentists

1. Dentists must learn to appreciate that practice among children is a highly satisfactory occupation when practitioners work as diligently to master the modifications of its technics and to diagnose and control the problems of childhood health, growth, development and exchange of dentitions as they do to master the technics of prosthetics or of minor oral surgery.

2. Dentists must see that children no longer are turned away from dental offices as undesirable patients. If dentists do not wish to treat children in family practice, it appears sensible to turn the job over to local health departments, with committees or health councils of local dental societies responsible for setting up policies and standards and perhaps supplying some professional supervision. Dentists should ponder this alternative well, however, before they decide to limit themselves to treatment of adults.

3. Dentists must heed the social trends, which indicate that a demand for an adequate dental health program for children will have to be met first in any nationwide extension of dental care, and must prepare themselves accordingly. They should support and build up a strong bureau of public health dentistry in each state, with trained personnel to gather data on which the profession can base intelligent plans for the future. This bureau should assume leadership in providing opportunities for dentists to inform themselves thoroughly about the extent of the state's dental problem. It should administer scientifically any public dental program that has been developed in cooperation with the dentists of the state and it should support dentists to the same degree to which dentists support the bureau.

4. Dentists must realize that the public does have a stake in the practice of dentistry and must learn to respect the public point of view. In matters involving the art and applied science of dentistry, the dentist is the sole authority; in economic aspects of the dental health problem, however, as well as the administrative aspect, the people have equal rights and equal concern. How much dental care will cost, how the consumer will pay for it, in what form it should be offered—these are becoming matters of interest to the public as well as to dentists. The interest of the public can become disturbing. The demands of organized labor for health programs furnish illustrations of the growing size and strength of this interest. One economist, indeed, predicted more than a year ago that, barring another world war, a modified national health bill of the Wagner-Murray-Dingell type eventually would pass Congress with the support of both the American Medical and the American Dental Association, because both groups would become thoroughly frightened of the unions' demands.

5. Dentists must recall that what is probably one of the harshest laws of nature still operates: that there is no surer road to extermination than failure to adapt to a changing environment. It is doubtful that dentistry long can maintain its position as an independent health profession in a security-minded nation while supplying its services to only 20 or 25 per cent of the people—including even a smaller percentage of the people's children.

REPORTS OF COUNCILS

COUNCIL ON DENTAL THERAPEUTICS

REPORT OF THE TWENTIETH ANNUAL MEETING OF THE COUNCIL ON DENTAL THERAPEUTICS

THE Council on Dental Therapeutics met with the Advisory Committee to the Bureau of Chemistry on February 3, 4 and 5 in the A.D.A. Central Office building. The Council meets once a year to revise and formulate policy and plan for the future. The bulk of the deliberations of the Council are conducted through a confidential mimeographed bulletin prepared under the direction of its secretary and mailed to the members of the Council and of the Advisory Committee to the Bureau of Chemistry. The bulletin is usually issued every two weeks.

Therapeutic Research

The Council received progress reports on the following therapeutic investigations which are being supported in part by funds from the American Dental Association:

"The Mechanism of Hypersensitive Dentin and Innervation of Dentin"—Arthur B. Gabel, Darby professor of operative dentistry, the Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania.

"Factors Which Will Promote Fracture Healing"—Wallace D. Armstrong, director of Laboratory of Dental Research, University of Minnesota School of Medicine.

"Study of Chemical Disinfection Solutions"—Holmes T. Knighton, Washington University School of Dentistry, St. Louis. (This project has been completed and the data are on file in the Council office.)

"Silver Nitrate—Zinc Oxide Cement Study"—Philip Burwasser, Western Reserve University School of Dentistry.

"Desensitizing Agents for Sensitive Necks of Teeth"—Robert G. Kesel, University of Illinois College of Dentistry.

Nomenclature

The Council voted to broaden its requirements with regard to the names of products within its scope. Under the rule which was in effect at the time of the meeting, names which suggested pharmacological or chemical action were unacceptable. The Council decided to consider such names acceptable in the future. Under the revised rule, names such as Blank's Disinfecting Solution or Blank's Topical Anesthetic will be acceptable, whereas names such as Blank's Toothache Remedy or Blank's Headache Tablets will not.

For many years the trend has been away from the use of Latin in prescription writing and in the literature on therapeutics. The Council voted to delete Latin names and synonyms from the next revision of *Accepted Dental Remedies*.

The Council discussed the meanings which have been attributed to such

terms as "sterilizer," "disinfectant," "germicide" and "antiseptic" with a view to the adoption of definitions for these and other terms relating to antibacterial activity. The Council has already published a statement of its policy with regard to the terms "germicide" and "disinfectant."[1] The Council decided to obtain further information on the policies of other agencies, with a view to standardizing nomenclature in this field.

Prescription Legends

The Federal Food, Drug and Cosmetic Act states that, with certain exceptions, a drug shall be deemed to be misbranded unless its labeling bears adequate directions for use.[2] Items which may be obtained only on prescription are exempted from this provision if they carry the following statement: "Caution: To be used only by or on the prescription of a . . . . ." The blank is to be filled in with the word "Physician," "Dentist" or "Veterinarian" or any combination of these words.

Certain prominent drug manufacturers who market some of their products primarily to physicians, have objected to the inclusion of the word "Dentist" in such statements, contenting themselves with the word "Physician." Their reasons are not entirely clear. However, it has been reported that the prescription of dentists for such drugs has not always been honored by pharmacists and that the excuse used by the pharmacist was that the label did not specify the dentist.

The Council voted that it would not, in the future, accept products which bear the unqualified legend, "To be used only by or on the prescription of a physician." This provision will also apply to all currently accepted products at the expiration of their current terms of acceptance.

Fluoride Desensitizing Preparations

The Council discussed various chemical mixtures which have been advocated for the relief of dentinal hypersensitivity. It was decided that solutions or mixtures containing as much as 33⅓ per cent of sodium fluoride are suitable for brief topical application to the external surfaces of the teeth. There is a considerable amount of evidence that such preparations will desensitize dentin in a large percentage of cases. However, the Council does not favor the use of fluorides on freshly cut dentin or as dentinal anesthetics in conjunction with cavity preparation, since pulp damage may result. Such preparations may devitalize the pulp if they are sealed in a recently prepared cavity.

Scope

A joint meeting of the Bureau of Chemistry Advisory Committee, the Council on Dental Research and the Council on Dental Therapeutics was held on Saturday morning, February 5. The duties and scope of the three committees under the current Bylaws of the Association and means for coordinating their activities more closely were discussed. The joint meeting resulted in the establishment of workable administrative policies which should result in excellent correlation of the work of the three committees.

1. Council on Dental Therapeutics. "Germicide" vs. "Disinfectant": A Statement of Policy. *J.A.D.A.* 38:269 (Feb.) 1949.

2. *Federal Food, Drug, and Cosmetic Act and General Regulations for Its Enforcement*, Sec. 502 (f), p. 27. (S.R.A., F.D.C. 1, Rev. 2, issued July 1946.)

MISCELLANEOUS THERAPEUTIC APPLICATIONS FOR SODIUM FLUORIDE IN DENTISTRY

THE topical application of a paste consisting of equal parts of sodium fluoride, calcium carbonate and glycerin as a means of treating hypersensitive necks of teeth was suggested in the Russian daily newspaper, *Isvestia*, in 1937. An English translation of the article is available.[1] The author speculated concerning the mechanism by which desensitization occurred.

A 92 page report on the actions and uses of sodium fluoride, published originally in Russian in 1940, was condensed in English in 1945.[2]

In 1941 there appeared a report in English of a Russian investigation of the actions and uses of various preparations of sodium fluoride, most of them for topical application.[3] The investigator believed that sodium fluoride, when applied to dentin, would form a shallow, relatively dense, hard layer as a result of a chemical combination between the fluoride ion and the calcium in the dentin and that this layer would act as a barrier to the transmission of sensation and bacteria. He thought that desensitizing effects were not due to direct action on the dental pulp when the fluoride preparations were used as recommended.

Among the topical applications recommended by the Russian investigator in 1941 were:

1. Treatment and filling of root canals of pulpless teeth.
2. Treatment of the dentin exposed on the inner walls of teeth after the root canals have been filled.
3. As a dressing for amputated or extirpated pulp stumps.
4. As a protective filling material.
5. As an anesthetic prior to cavity preparation and as a desensitizing agent for dentin after cavity preparation.
6. As an external application to relieve hypersensitivity, especially on the cervical portion of the tooth.

The following topical uses were said to be contraindicated:

1. Application to deciduous teeth.
2. Application to pulps which are exposed by caries.
3. Application in periodontosis in the presence of marked alveolar atrophy.

The article is somewhat disconnected and the data are not complete. It is a remarkable report, however. Apparently much work was done, and many fluoride preparations and methods of treatment were tested on a large number of patients.

In 1943, American investigators reported the results of a clinical study of the effects of topical fluoride preparations on "naturally occurring" sensitive dentin.[4] A 2 per cent aqueous solution of sodium fluoride was found to produce slight obtunding effects. A 4 per cent solution was more effective when applied repeatedly. Mixtures of sodium fluoride with china clay (kaolin) and glycerin were then tried, and a mixture of equal parts of the three ingredients was selected for a study on 70 patients. In order to rule out glycerin as an obtunding agent,

1. Lukomsky, I., A New Dentine Desensitizer. *D. Outlook* 24:537 (Dec.) 1937.
2. Lukomsky, I., *Fluorine in Medicine*. Moscow: *Narkomsdrav. Medgiz*, 1940. Abstracted in *Am. Rev. Soviet Med.* 2:543 (Aug.) 1945.
3. Lukomsky, E. H., Fluorine Therapy for Exposed Dentin and Alveolar Atrophy. *J. D. Res.* 20:649 (Dec.) 1941.
4. Hoyt, W. H., and Bibby, B. G., Use of Sodium Fluoride for Desensitizing Dentin. *J.A.D.A.* 30:1379 (Sept. 1) 1943.

6 highly sensitive teeth were treated with a mixture of china clay and glycerin. Desensitization did not occur, but subsequent treatment of the same teeth with the fluoride paste was followed by desensitization.

The treatment method was described as follows:

> After a preliminary cleaning with a pledget of cotton moistened with a 4 per cent sodium fluoride solution, the area to be treated was isolated with cotton rolls, a pledget of cotton being used to remove free moisture. A small amount of 33 per cent sodium fluoride paste was then taken on the end of a small plastic instrument and placed on the tooth. The paste was then rubbed vigorously on the sensitive surface of the tooth with the plastic instrument, with concentration on any areas where pain (sensation of refrigeration) was encountered. This was continued until all sensation disappeared, the time necessary ranging from one to five minutes. Occasionally, when pain became acute, the paste was washed off with a warm spray. In such instances, a second treatment was given immediately, without difficulty. When the pain disappeared, the cotton rolls were removed, and, at the same time, as much paste as possible was wiped off. This was followed by prompt washing with a spray bottle, and a thorough rinsing of the mouth by the patient.

Desensitization occurred in a very high percentage of the cases. The paste may be applied with an orangewood stick in a porte-polisher.

Reports of several investigators which tend to confirm the reported effectiveness of concentrated preparations of sodium fluoride in alleviating hypersensitive dentin have since appeared in the literature.[5-8] There have been two additional publications in Russian.[9, 10] Estimates of the rate of absorption of fluoride by dentin have been reported.[3, 11]

Fluoride paste has been found to be effective in desensitizing freshly cut dentin, during and following cavity preparation.[4] Several investigators have found that sodium fluoride sealed in freshly cut dentin will damage the pulp.[12-14]

Comment

The available evidence indicates that topical application of concentrated solutions of sodium fluoride or mixtures of sodium fluoride with glycerin, kaolin or calcium carbonate is effective in reducing the sensitivity of dentin, and that such mixtures may be applied briefly to the external surfaces of the teeth provided tooth substance is not cut away prior to the application of the fluoride and reasonable care is taken to avoid ingestion or prolonged contact with soft tissue.

Other dental uses of sodium fluoride, except topical application of 2 per cent aqueous solution for the prevention of dental caries, are not yet supported by sufficient evidence to warrant their general adoption. The use of sodium fluoride in conjunction with cavity preparation or as an ingredient of filling material in vital teeth is contraindicated because of the possibility of damage to the pulp.

5. Sorrin, Sidney, Sodium Fluoride Method for Desensitizing Erosion Areas. *New York J. Den.* 13:399 (Dec.) 1943.

6. Wells, F. M., Sodium Fluoride Treatment of Hypersensitive Teeth. *D. Digest* 50:312 (July) 1944.

7. Hunter, A. G., Fluorine Therapy. *D. J. Australia* 17:301 (Aug.) 1945.

8. Clement, A. J., Sodium Fluoride Paste as a Desensitizing Agent for Hypersensitive Dentine. *Brit. D. J.* 82:168 (Apr. 18) 1947.

9. Fridman, Y. L., Morphological Changes in Dentine Under the Influence of Sodium Fluoride. *Stomatologiya* 1:20, 1946. Abstracted in *Chem. Abstr.* 40: 5486 (Sept. 20) 1946.

10. Lukomskii, I. G., Prevention of Caries by Means of Local "Fluorization." *Stomatologiya* 2:13, 1946. Abstracted in *Chem. Abstr.* 41:516 (Jan. 20) 1947.

11. Fridman, Y. L.; Drobova, G. V., and Ginodman, F. G., Absorption of Fluorine by Dental Tissues. *Stomatologiya*, No. 2, p. 14-17, 1943. Abstracted in *Am. Rev. Soviet Med.* 2:74 (Oct.) 1944 and *Chem. Abstr.* 39:985 (Mar. 10) 1945.

12. Barker, J. N., Reactions of the Pulp to Various Filling Materials and Clinical Procedures. *Australian J. Den.* 46:226 (Dec.) 1942.

13. Lefkowitz, W., and Bodecker, C. F., Sodium Fluoride: Its Effect on the Dental Pulp. *Ann. Den.* 3 (New Series): 141 (Mar.) 1945.

14. Rovelstad, G. H., The Condition of the Young Dental Pulp After the Application of Sodium Fluoride to Dentin. *Northwest. Univ. Bul.* 48:6 (Nov. 17) 1947.

PRELIMINARY COMMENTS ON DENTAL PRODUCTS

THE following statements concerning products which are not accepted by the Council on Dental Therapeutics are designed to be free from controversial opinions. The Council may publish comprehensive status reports on these products whenever such reports are warranted, and will accept those which are found to be eligible for acceptance.

Amfluor Fluoride Solution

This product is marketed for use by dentists in their practices as an aid in preventing dental caries. It is supplied in two separate glass bottles, packaged together. One bottle contains a 4 per cent aqueous solution of sodium fluoride; the other contains a one-third molar solution of sodium dihydrogen phosphate (NaH_2PO_4). Graduated medicine droppers are provided so that equal volumes of the two solutions may be mixed before use. The distributor of the product states that the solution prepared by mixing equal volumes of the two solutions will have a pH of approximately 5.1.

Unbuffered aqueous solutions of sodium fluoride have been found to become alkaline upon standing in ordinary pharmaceutical glass containers.[1] The clinical significance of this change is not known. Only the simple 2 per cent solution of sodium fluoride in distilled water is supported by sufficient direct clinical evidence to warrant its routine use in dental practice.[1] The results of laboratory investigations suggest that fluoride solutions buffered on the acid side may be superior in some respects to neutral or alkaline fluoride solutions.[2] Clinical studies to explore the possibilities of buffered fluoride solutions are in progress.

Amfluor Fluoride Tablets

These tablets are marketed for oral use in the partial prevention of dental caries. They are prepared by combining a measured quantity of the soluble dried residue from fluoride-bearing artesian well water with an effervescent base.

The artesian well water is stated to be alkaline, and to contain relatively little calcium or magnesium and 3.6 parts per million of fluorine. The finished tablets are stated to contain 0.9 mg. of fluorine each.

With respect to the pharmacologic action of the tablets, the firm states, "Since this tablet contains all the substances present in a natural fluoride-bearing water, the therapeutic values of such water with respect to protection against dental caries are inherent in a solution of the tablet." The Council is not aware of any controlled clinical evidence with regard to this preparation or other oral tablets which contain water-soluble fluoride.

There is no reason to believe, on the basis of the available evidence, that this preparation would be more effective in preventing dental caries than would any other tablets containing 0.9 mg. each of readily ionizable fluorine in soluble form. There is no correlation between the relative hardness of fluorine-bearing public water supplies and the incidence of dental caries among persons who spend their

1. Joint Report of the A.D.A. Bureau of Chemistry and the Council on Dental Therapeutics, Formulation and Packaging of Aqueous Solutions of Sodium Fluoride for Topical Application. *J.A.D.A.* 38:142 (Jan.) 1949.

2. Phillips, R. W., and Swartz, Marjorie, Effect of Fluorides on Hardness of Tooth Enamel. *J.A.D.A.* 37:1 (July) 1948.

childhood in the community served by the water supply.[3] It is therefore not logical to assume that the presence in this preparation of constituents derived from artesian well water, other than fluorine, would contribute to the therapeutic effectiveness of the preparation.

The interested reader will undoubtedly wish to consult other references with respect to this type of preparation.[4, 5]

Lozilles

Lozilles Tyrothricin-Propesin Lozenges are stated to contain 2 mg. each of tyrothricin and propyl p-aminobenzoate together with sucrose, 940 mg.; corn syrup, 20 mg.; color; flavoring, and excipient. The directions for use specify one lozenge every two or three hours to a maximum of eight a day.

Tyrothricin is an antibiotic obtained from Bacillus brevis. It is suitable for topical application to the mucous membranes, but is ineffective when ingested orally and toxic when injected. It is active against several species of gram-positive organisms.[6]

Propesin is a trade name for n-propyl p-aminobenzoate, similar chemically and in anesthetic properties to benzocaine (ethyl p-aminobenzoate). Propyl p-aminobenzoate is soluble in ether, benzene and alcohol, but only sparingly soluble in water. There is relatively little information with regard to this drug in the recent scientific literature.[7-9]

The advertising recommends the use of "Lozilles" for relief of local oral pain, after difficult extractions and other oral surgical procedures, for acute stomatitis and gingivitis caused by gram-positive organisms, and "in patients whose oral flora persistently contain excessive numbers of Lactobacillus acidophilus and other acid-forming bacteria (the growth of such organisms being inhibited by tyrothricin), which may be a cause of dental caries." The advertising states further, "A daily dosage of one Lozille, taken as recommended, every two hours throughout the day and upon retiring will prove adequate in most cases of acute mouth and throat infection."

The distributor of the product has submitted data from unpublished preliminary studies and abstracts of 15 case reports by a physician, which suggest possible usefulness and the desirability of further research on this type of product. The Council on Dental Therapeutics is not aware of controlled clinical evidence that "Lozilles" are useful in the treatment of stomatitis or gingivitis or in the prevention of dental caries.

Cal-C-Tose

Cal-C-Tose is a dietary supplement in powder form, designed to be mixed with milk in order to increase the consumption of certain vitamins and minerals and to disguise the taste and appearance of milk.

Four heaping teaspoonfuls of "Cal-C-Tose," enough to flavor two glasses of milk, are stated to contain 4,000 units of vitamin A, 1,000 units of vitamin D, 4 mg. of thiamine hydrochloride, 2 mg. of riboflavin, 10 mg. of nicotinamide, 150 mg. of ascorbic acid, 400 mg. of calcium, 320 mg. of phosphorus and 20 mg. of

3. Moulton, F. R., *Dental Caries and Fluorine.* (Dean, H. T., "Epidemiological Studies in the United States," pp. 27-29). Washington, D. C.: American Association for the Advancement of Science, 1946.

4. Easlick, K. A. (editor), *Dental Caries.* (Arnold, F. A., Jr., "Evaluation of the Effectiveness as Caries Control Measures of Ingested Fluorides in Water, Food, Bone Flour, and Proprietary Preparations," p. 111). St. Louis: C. V. Mosby Co., 1948.

5. McClure, F. J., Ingestion of Fluoride and Dental Caries. Quantitative Relations Based on Food and Water Requirements of Children One to Twelve Years Old. *A. J. Dis. Child.* 66:362 (Oct.) 1943.

6. Council on Pharmacy and Chemistry, American Medical Association, *New and Nonofficial Remedies.* Philadelphia: J. B. Lippincott, 1948, p. 66.

7. Bodendorf, K., History of Local Anesthetics From the Series of p-aminobenzoic Esters. *Apoth. Ztg.* 49:1642 (Dec.) 1934.

8. Adams, Roger, and others, Chemical Constitution, Physiological Action and Physical Properties in the Series of Alkyl p-aminobenzoates. *J. A. Chem. Soc.* 48:1758 (June) 1926.

9. Osol, Arthur, and Farrar, G. E., Jr., *U. S. Dispensatory,* ed. 24. Philadelphia: J. B. Lippincott, 1947, p. 1329.

iron in a base consisting of sucrose, maltose, malt, cocoa, vanillin and coumarin.

Accepted Dental Remedies contains much practical information concerning nutritional factors.[10]

Sodascorbate Tablets

Each tablet is stated to contain 120 mg. of sodium ascorbate, the sodium salt of ascorbic acid, together with sugar, starch, calcium stearate and coloring. The sodium salt differs from ascorbic acid in that it is approximately neutral in reaction. One hundred and twenty milligrams of sodium ascorbate is equivalent to 107 mg. of ascorbic acid.

In the advertising it is claimed that vitamin C (ascorbic acid) is of value in dental caries when there is a known deficiency of vitamin C or pathologic interference with assimilation of the amount necessary for the preservation of health. The Council on Dental Therapeutics has not permitted claims that administration of vitamin C is of value in the prevention of dental caries. The actions and uses of vitamin C are discussed in *Accepted Dental Remedies*.[11]

Fluorine Water

Natural Fluorine Water is distributed in the Chicago area by Hinckley and Schmitt, Inc. The water is bottled in containers of a size convenient for table use. It is stated to contain 0.8 part of fluorine per million parts of water. This is slightly less than one part per million which is often mentioned as an optimum concentration. The distributor explains that it is not commercially feasible to risk even the slight amount of fluorosis which might occur with one part of fluorine per million parts of water.

The only statement on the label with regard to action and uses of the product is: "NATURAL FLUORINE WATER CONTAINING THE PROPER AMOUNT OF FLUORINE IS BENEFICIAL IN PREVENTING DECAY OF THE TEETH." The concentration of fluorine is stated on the label. A folder refers to the finding of low caries incidence in children in areas where fluorine occurs naturally in the public water supply, and recommends the product as "a quality table water for the entire family." The cost is stated as 2½ cents a glass.

The folder and label do not explain that, in order to receive maximum or even appreciable benefit from the fluorine content of the product, two conditions must be met. First, the consumer must be young enough so that the crowns of his teeth are still developing. Second, the product must be used in the preparation of his food as well as for drinking purposes.

Ideal Pocket Treatment

This is a semifluid preparation packaged in dental cartridges and stated to contain phenol, 5.3 per cent; peppermint oil, 4.2 per cent; formaldehyde solution, 2.7 per cent; cresol, 2.5 per cent, in a lanolin-petrolatum base. The product is intended for local use in coagulating gingival tissue, as an adjunct to the usual surgical and other measures generally employed in the treatment of gingival disease.

Controlled clinical evidence concerning the effects of this preparation is lacking. Many empiric combinations of phenol with other drugs have been used extensively in dentistry. Modern operative and surgical methods for the removal of unwanted tissue have largely displaced "drug surgery."[12]

10. *A.D.R.*, ed. 14, p. 136.
11. *A.D.R.*, ed. 14, p. 145.
12. *A.D.R.*, ed. 14, p. 93.

COUNCIL LISTS PRODUCTS FOR "ACCEPTED DENTAL REMEDIES"

THE Council on Dental Therapeutics of the American Dental Association announces the inclusion of the following products in the list of *Accepted Dental Remedies:*

Antibiotics[1]

Penicillin Sodium-Heyden: In 500,000 unit vials. Marketed by Heyden Chemical Corporation, New York.

Penicillin Potassium Buffered Tablets (Soluble), 50,000 Units: Stated to contain crystalline penicillin G potassium, citric acid, sodium bicarbonate and sodium benzoate. In bottles of 12. Manufactured by Abbott Laboratories, North Chicago, Ill.

Astringents, Hemostatics and Vasoconstrictors[2,3]

Oxidized Cellulose—Novocell.

Novocell Pellets: In sterile containers of 25. Manufactured by Novocol Chemical Mfg. Co., Inc., Brooklyn.

Quaternary Ammonium Compounds[4]

Parker's Germicidal Tablets: Each 100 Gm. is stated to contain para di-isobutyl phenoxy ethoxy ethyl dimethyl benzyl ammonium chloride monohydrate, 12.5 Gm.; sodium nitrate, 41.1 Gm.; corn starch, 7.1 Gm.; sodium bicarbonate, 39.3 Gm.; magnesium stearate, 0.3 Gm., and color. In bottles of 40. Manufactured by the A. J. Parker Company, Philadelphia.

Radiol Germicidal Solution Concentrate: Each 100 Gm. is stated to contain cetyl ethyl dimethyl ammonium bromide, 1 Gm.; sodium bicarbonate, 1 Gm.; sodium nitrite, 1 Gm., and water. Manufactured by Novocol Chemical Mfg. Co., Inc., Brooklyn.

Phenolic Compounds[5]

Sanford's Disinfecting Solution Formula B: Each 100 Gm. is stated to contain isopropyl alcohol, 70 Gm.; cresol, 2 Gm.; propylene glycol, 10 Gm.; pine oil emulsified with rosin soap, 1 Gm., and distilled water, 17 Gm. Marketed by Formula Products Company, Los Angeles.

Admission to *Accepted Dental Remedies* means that the product was found to conform to the rules of the Council when it was accepted. Accepted products are reconsidered periodically. The files of the Council contain information on many drugs and dental cosmetics, and inquiries are welcomed.—*Donald A. Wallace, Secretary.*

1. *A.D.R.*, ed. 14, p. 59.
2. *A.D.R.*, ed. 14, p. 103.
3. Council on Dental Therapeutics, Council Lists Products for "Accepted Dental Remedies." *J.A.D.A.* 37:700 (Dec.) 1948.
4. *A.D.R.*, ed. 14, p. 94.
5. *A.D.R.*, ed. 14, p. 89.

COUNCIL ON LEGISLATION

WAGNER-MURRAY-DINGELL BILL GETS FACE LIFTING IN REVISED VERSION

Closely following the President's message to Congress urging the adoption of what the administration now terms "prepaid health insurance benefits," three identical measures were dropped into the Congressional hoppers on April 25, 1949. These bills will replace S. 5, H.R. 345 and H.R. 783. The new Senate bill, S. 1679, is sponsored by Senators Thomas of Utah, chairman of the Labor and Public Welfare Committee, Murray of Montana, Wagner of New York, Pepper of Florida, Chavez of New Mexico, Taylor of Idaho, McGrath of Rhode Island and Humphrey of Minnesota, all Democrats. It is significant that the bill's first named sponsor is Senator Thomas. This stamps it as an Administration measure since it is customary for the chairman of the appropriate committee to introduce bills sponsored by the Administration. The new House bills, numbered H.R. 4312 and H.R. 4313, were introduced, respectively, by Representatives Dingell of Michigan and Biemiller of Wisconsin. Representative Dingell has long had his name associated with this measure. Although new to sponsorship of this bill, Mr. Biemiller has sponsored many bills relating to the Social Security program.

New Bill Has Seven Parts

Where S. 5 occupied 84 printed pages the new bills take 163 and cover much more territory. S. 1679 contains seven separate titles or divisions. Title I is "Education of Health Personnel" and covers proposals for grants to schools and payment of scholarships to students in medicine, dentistry, dental hygiene, public health work, nursing, sanitary engineering, hospital administration and related professions. It also makes special provision for practical nurse training. Medical research is covered by Title II, which would authorize the establishment of additional research institutes and advisory councils. The institutes would deal with the cause, prevention, diagnosis and treatment of poliomyelitis, diabetes, arthritis and rheumatism, multiple sclerosis, cerebral palsy and epilepsy, or any other diseases or groups of diseases. Title III deals with the expansion of Hospital facilities under the Hill-Burton Act. Title IV directs its attention to shortages of physicians, dentists, nurses, hospitals, clinics and other requisites of adequate medical service in rural and similar areas. Title V has for its field "Grants to States for State and Local Health Work." Title VI focuses on "Research in Child Life and Grants for Maternal and Child Health and Crippled Children's Services." Title VII is an old friend, "Prepaid Personal Health Insurance Benefits."

Tax Provision Not Included

As usual there is no tax provision in the bill. It merely authorizes the appropriation of certain funds to carry out the purposes of the several titles. However, the base for the appropriation is raised to the first $4,800 of earned income. If the tax machinery to raise the necessary funds were to be included the bill, under the Constitution, would have to originate

in the House of Representatives alone and would have to be referred to the Ways and Means Committee, which is reputedly of more conservative make-up than the Interstate and Foreign Commerce Committee. Similarly, the tax aspect would require reference to the conservative Senate Committee on Finance in preference to the Labor and Public Welfare Committee which has been its friendly shelter for so many years.

S. 1679 commences with a four page declaration of purpose reciting at great length certain "conclusions" and the intention of the Congress in enacting the legislation. Certain of these "conclusions" appear to be arbitrary and not susceptible of proof; for example, ". . . the tremendous advances in medical science in recent years have necessarily meant great increases in the cost of health services." This section will be of great importance if the bill is enacted, since it will be the Rosetta Stone to which the administrators of the act would look for authority to carry out regulations not specifically covered by the text of the bill. It should be noted that the bill is full of directives to accomplish general aims but lacks specific provisions telling how these aims should be accomplished.

Funds for Dental Schools Provided

Title I of the bill relates to the so-called "tooling up" process recommended in the Ewing Report. It is a redraft of S. 1456, Eight-first Congress, introduced by Senator Pepper. It proposes to make grants to schools on a basis of enrollment for the purpose of stimulating expansion of facilities and increasing the number of students in the health professions. Under its terms dental schools would receive $250 for each student up to their average enrollment for the fiscal years 1947, 1948 and 1949, and $1,300 for each additional student. Similarly schools of dental hygiene would receive $150 for each student up to the average enrollment and $800 for each additional student. Each school is limited, however, to an amount equivalent to 50 per cent of the actual cost of instruction. These payments would, apparently, be outright grants and would not have to be repaid. Schools accepting such grants would be required to carry out certain policies of the federal government for a period of ten years.

Scholarships for Dental Students

The bill would make scholarships available to students of dentistry and dental hygiene. Funds would be allotted to the various states on a basis of state population and need for personnel. Students would be selected on the basis of ability and other factors not named. Scholarships would be available while the student's work continued to be satisfactory and would include a maintenance allowance of $125 per month for a student without dependents, $150 per month for a student with one dependent and $175 per month for a student with two or more dependents. The scholarship would also include the cost of tuition, educational fees, books and equipment and would last for the period of time normally required to complete the course.

Recipients of scholarships would agree to serve one year for each two academic years during which the scholarship was held either (1) as an employee of the state which selected him or of a political subdivision of such state, (2) on full time duty with a medical agency or unit of the federal government or (3) in the practice of his profession in an area designated by the state as one in need of additional personnel trained in his profession.

This part of the act is to be administered by the Surgeon General of the U. S. Public Health Service through regulations issued after consultation with the National Council on Education for

Health Professions created by the act. Dental educators would be represented on the council.

Titles II and III are not of direct interest to dentistry.

Inducements to Practice in Rural Areas

Title IV is a tool to aid in carrying out the purposes of Title VII (the compulsory health insurance title). Under it the National Health Insurance Board could make grants or loans to members of the health professions, including dentists, to induce such persons to work in rural areas or places where a shortage of professional personnel existed. The board could guarantee minimum or gross incomes, pay the cost of transportation of technical personnel and their families to the selected areas and make grants to aid in maintenance and operation of local facilities for group practice. It could make loans, repayable without interest, for periods up to ten years for the cost of facilities and durable equipment. It could also make provision for mobile clinics and for special activities appropriate to the area. Appropriations of $35,000,000 for three years commencing with fiscal 1950 are authorized to carry out this title. Grants may also be made to cooperatives which will undertake to provide medical and dental care to their members. A rural area is defined for purposes of grants to cooperatives as "an area which is not, does not contain, and is not adjacent to any city or town having a population of 10,000 or more."

Title V provides grants in aid to states for state and local public health services for their development, extension and improvement. Grants may be made for the prevention, treatment and control of named diseases, including dental disorders. Funds may also be used for the training of personnel for state and local health work, presumably including the training of dental personnel.

Dental Services for Children

Part B of Title VI authorizes grants to states for the promotion of physical and mental health of mothers during maternity, and of infants and children under the age of 18 years. It includes dental services and facilities. It is particularly concerned with the correction of defects and health conditions in children of preschool and school age which are likely to interfere with their normal development and educational progress. Dental services for crippled and physically handicapped children are also provided as an object of the grants. Under this part, services are to be rendered to children "without regard to economic status" and without regard to race, creed, color or national origin.

Title VII is generally the same as S. 5 and need not be digested here as it has previously been discussed at length in THE JOURNAL.[1, 2] It will suffice to say that dentistry is included and that dental services to be rendered consist of general services (preventive, diagnostic and therapeutic care), periodic examinations and specialist services rendered by a dentist who is a specialist in the particular field of dentistry involved.

1. Three Compulsory Health Insurance Bills Before Congress: $15 Million Asked as Starter. *J.A.D.A.* 38:242 (Feb.) 1949.

2. S. 5: Analysis of the Latest Wagner-Murray-Dingell Bill. *J.A.D.A.* 38:492 (April-Section 2) 1949.

STATEMENT CONCERNING A.D.A. IN "VITALINER" ADVERTISEMENT HAS NO BASIS IN FACT

In an advertisement of The Vitaliner Company, 20 East Jackson Boulevard, Chicago 4, which refers to their product "Vitaliner," there appears the statement, "Ours is the only liner not condemned by the A.D.A."

The Council on Dental Research under date of January 31, 1949, requested The Vitaliner Company to cite the reference on which such a statement was based. This letter also gave evidence that the statement had no basis in fact.

The Vitaliner Company in a letter dated February 7, 1949, stated, "Our next round of advertising will not contain the sentence." On March 19, 1949, the same advertisement was received by one of the American Dental Association research associates at his home address. Again the sentence, "Ours is the only liner not condemned by the A.D.A.," was present.

The Council on Dental Research, therefore, makes the public announcement that the foregoing statement has no basis in fact.

THE Journal OF THE
AMERICAN DENTAL ASSOCIATION

JUNE 1949 • VOLUME 38 • NUMBER 6

LON W. MORREY, D.D.S., *Editor*

Published by the American Dental Association • 222 East Superior St. • Chicago 11, Ill.

EDITORIALS

CONGRESS CONSIDERS THE NATION'S HEALTH: DIFFERS ON METHODS, NOT GOALS

THE introduction on April 25 of the administration's newest compulsory health insurance bill, S.1679, adds still another legislative proposal to the multitude of health measures now before Congress. To judge by the volume of these measures, health legislation ranks first in the political interests of most congressmen.

Ten years of study and controversy since the first Wagner health bill was introduced in 1939 have aligned congressional leaders into three camps: those who would leave medical and dental care largely in private hands with some assistance from government funds; those who would provide federal grants-in-aid to states to assist them in solving their own health problems; those who favor a system of federal compulsory health insurance.

S.1456 sponsored by Senators Hill, O'Connor, Withers, Aiken and Morse is based on the philosophy of those who would augment the private practice of medicine and dentistry. The Hill proposal would enable state health agencies to pay all or part of voluntary health insurance premiums for people unable to meet such payments. Costs would be split between the federal and state governments, and the expansion of state public health programs would be encouraged.

S.1518 sponsored by Senators Taft, Smith of New Jersey, and Donnel, by providing federal grants-in-aid to states, would enable state health agencies to furnish health care to people unable to pay all of the cost of such service. It also would provide federal subsidies to medical schools and hospitals and furnish funds for the examination and health care of needy children.

S.1679 sponsored by Senators Thomas, Murray, Wagner, Pepper, Chavez, Taylor, McGrath and Humphrey, with companion bills H.R.4312 and H.R.4313 introduced

by Representatives Dingell and Beimiller respectively, is the latest brain child of those who would force compulsory health insurance upon the American people. Buttressed by the support of President Truman, S.1679 is an omnibus bill of the most ominous order. It has as many sections as it has sponsors and it provides for almost every form of financial aid to almost every form of health service that almost every congressman could dream up. Introduced on April 25, it supersedes S.5 which was proposed last January by essentially the same sponsors. The annual cost of this latest mélange has been estimated at from six to sixteen billion dollars—staggering even to a Congress accustomed to colossal expenditures. The cost, however, of S.1679 is not the chief concern of the health professions. Of more importance is the detrimental effect which the compulsory features of the bill will have on standards of service.

With Congress concerned over rising costs, with the public concerned over rising taxes and with the professions and the public concerned over lowering standards of service, it is paramount that the Congress, in the national interest, shelve immediately all consideration of this uneconomic and unscientific compulsory health insurance proposal.

U. S. COMMERCE DEPARTMENT CONDUCTS STUDY OF DENTAL INCOMES

CURRENTLY the U.S. Department of Commerce is conducting a nationwide economic survey of the dental profession. This study, like similar studies made in 1937 and 1941, has been approved by the Board of Trustees of the American Dental Association.

Communications were sent in April by the Department to approximately one third of the dentists in the country requesting information on gross and net income, location and type of practice, average number of operating hours a week and other economic data pertinent to the practice of dentistry. These data when analyzed and compared with information from previous studies will enable the profession to evaluate its economic position in society, appraise its progress and estimate, to some extent, its future possibilities.

The compilation of statistics on national income has become an essentiality in our complex social structure, the responsibility for which rests with the Office of Business Economics of the Department of Commerce. Compiling data on most of the major industries and agriculture is comparatively simple, as such information may be obtained from annual reports. Collecting information from professional groups, such as dentists, physicians and lawyers is more difficult, as it can be obtained only by sample surveys.

The question has been raised as to why information on professional incomes cannot be obtained from the Bureau of Internal Revenue. The answer is obvious. Income tax reports are confidential documents and are not available to the Department of Commerce. Dentists may be assured that replies to the present questionnaire will be kept equally confidential; in fact, the Department requests that the

questionnaires not be signed. Dentists who have been asked to participate in this survey can contribute much to the economic studies of the profession by filling out the questionnaires and returning them promptly.

ASSOCIATION PUBLISHES PROCEEDINGS OF WELLS CENTENARY CELEBRATION

OCCASIONALLY a book is published that should become an important addition to the library of every dentist. Such a book is *Horace Wells, Dentist—Father of Surgical Anesthesia.* This handsome 415 page volume was compiled by the Horace Wells Centenary Committee of the Association under the direction of its chairman, Eugene M. Clifford, and was edited by William J. Gies. It presents a complete account of the International Wells Centenary Celebration held in Hartford, Connecticut, on December 11, 1944, plus accounts of similar memorial exercises held throughout the United States, Latin America, England and France. These records, augmented by an excellent bibliography, numerous testimonials and lists of memorabilia, provide the reader with a graphic picture of the triumph and tragedy of one who dared to risk his life to save the lives of others. One need not be a dental historian nor a sentimental admirer of Wells to value this book or to appreciate the labor of those who were responsible for its assembly and editing. Additional information regarding contents, price and source is published on page A-5 of this issue. Because the edition is limited it would be wise to order your copy now.

ROSCOE H. VOLLAND TO BE GIVEN TESTIMONIAL LUNCHEON AT 90TH SESSION

FRIENDS of Roscoe H. Volland will be given an opportunity to express their appreciation of his services to dentistry at a luncheon to be held in his honor during the Ninetieth Session of the Association in San Francisco next October. Arrangements have been completed to hold the luncheon in the Red Room, Fairmont Hotel, Monday noon, October 17.

The many years of unselfish service rendered to dentistry by Doctor Volland has won him a multitude of admirers, not only in the United States and Canada, but throughout the entire world. As a teacher, practitioner and research worker, as trustee, treasurer and president of the Association he has been privileged to contribute much more to science and society than most members of the profession. The testimonial luncheon will permit his confreres to express publicly their appreciation of his contributions. An announcement of the complete program will be published in a later issue of THE JOURNAL.

INTERNATIONAL CORRESPONDENCE

NEWS FROM BRITAIN

It is almost a year since the scale of fees for the General Dental Practitioner Service was announced. It was understood at that time that it was an interim scale and that as the scheme developed and more experience was gained, a more permanent one would be introduced after appropriate negotiations between the government and the profession. It was estimated that the Dental Service would cost about £7,000,000 ($28,000,000) in the first year. However after six months it was obvious that four or even five times that amount would be the first year's cost. Hence the sudden decision to limit the earnings under the scale of fees to £400 ($1,600) per month. After Feb. 1 all earnings over that figure per month are subject to a 50 per cent cut. Arrangements are now underway to revise the fees.

The original fees were prepared on an estimate of how long it would take the average dentist to carry out the various operations. Recently a committee was established, under the chairmanship of William Penman, to make an inquiry into the time factor of dental operations. The following letter from the chairman is quoted from the British Dental Journal to which it was sent:

"As was announced recently the Ministry of Health and the Secretary of State for Scotland have appointed a "working party" the duty of which is:

"To ascertain the average chairside time taken by general dental practitioners in England, Wales and Scotland (1) in the National Health Service and (2) in private practice to complete each type of dental treatment set out in . . . the First Schedule to the National Health Service (General Dental Services) Fees Regulations, 1948, excluding any items for which it is impracticable to establish an average time, e.g., orthodontic treatment.

"The working party consists of four professional members . . . [and] . . . the Minister has given the following assurance to the dental profession:

> (1) That action will be taken on the report of the working party only after consultation with the representatives of the dental organizations.
>
> (2) That any interim action which the situation may seem to require, prior to the issue and consideration of the report of the working party, will also be taken after consultation with the representatives of the dental organizations.

In giving this assurance the Minister is confident that the working party will make its investigation and prepare its report as speedily as may be consistent with thoroughness and accuracy.

"It seems evident that some such fact finding inquiry is in the interest of all parties—the public, the dental profession and the Ministry—and it is difficult to think of a committee more satisfactory than one nominated by the dental profession under an independent chairman. The working party has arrived at the conclusion that the inquiry must take the form of investigating a 'sample' of those members of the profession engaged in National Health work and a sample of 500 has been chosen as being an adequate number for the purpose. The 500 have been selected at random, making use of the Executive Council lists, in such a way that every part of the country is proportionately represented. The 500 selected dentists will receive shortly a communica-

tion from me, accompanied by a letter signed on behalf of the three dental organizations. . . . The communication from me, referred to above, makes the following points:

> (1) Any information which you may be good enough to supply will be confidential to the working party in the preparation of its report.
>
> (2) You will be identified by a number for the purpose of this inquiry, the information which you will supply will be merged for the purpose of statistical inquiry with similar information obtained from other dentists and there will be no disclosure of identifiable individual results.
>
> (3) The working party fully realizes that it is conducting an inquiry at a time when circumstances are abnormal but it invites you and the other dentists concerned to disregard any abnormality which exists. . . .
>
> (4) Nevertheless you may desire to give the working party the benefit of any comments you wish to make, which comments need not be limited to abnormality. . . ."

The time sheets sent to the 500 selected dentists give spaces for the exact time that the patient sits in the chair and another column for the time he leaves it. The operation carried out is noted and whether the treatment was completed or not. This latter point together with the one which arises when a patient has several operations carried out at the one visit may cause some difficulty in the use of these particular figures and to overcome it the time for each operation must be noted and a "C" indicates that the patient's operation was completed.

It is estimated that the report will not be available till the end of May. However, the newspapers, on April 24, announced that the new scale was to be expected in a week or two giving the revised rates of payment for the various dental operations. The revised scale of fees was at that time practically decided upon and an invitation had been issued to the dental associations to discuss the Minister's new proposals. It is believed that the British Dental Association refused on the grounds that sufficient time had not been taken by the Ministry to work out the fees and that they were ignoring the information that would be supplied by the working party report. The Ministry is anxious to reduce the costs of the service as soon as possible and it is thought that the new scale may be introduced on June 1.

It is rumored that the new scale contains considerable reductions amounting to 50 per cent in some cases. The smallest cut is said to be 12½ per cent for dentures. It is also said that the present arrangement whereby all monthly claims over £400 ($1,600) are subject to a cut of 50 per cent is to be maintained. Among the dentists in the service many are saying that they will withdraw or treat only selected patients under the National Health Service.

Local authorities are reported hoping that a halt will be called to the decline in popularity of school dentistry while in academic circles it is hoped that recently qualified dentists may again turn their attentions to the possibilities of an academic career. Recently it has been almost impossible to find candidates for the relatively poorly paid teaching jobs.—*John R. Boyes, Newcastle Upon Tyne.*

THE NATIONAL SCENE

from The Journal's Washington Correspondent

A situation without precedent, the holding simultaneously of public hearings in both House and Senate on national health legislation, is witnessing a steady procession to Capitol Hill of professional leaders from all parts of the nation. Originally scheduled for May 16, the opening of Senate committee hearings was postponed to May 23, while House committee hearings got under way May 20.

At press time, a group of liberal Republicans—both Senators and Representatives—was still holding conferences preparatory to the introduction of a new national health measure. Considerable interest was focused on their plan, designed to avert a stalemate in the bitter contest over compulsory health insurance. Principal feature of the bill is wholesale extension of participation in voluntary prepayment plans through federal assistance which would make possible a sliding scale of premium payments, the amount being dependent on the subscriber's income. Among Congress members who have been identified with the proposal are Senators Flanders of Vermont, Ives of New York and Knowland of California; Representatives Javits of New York and Herter of Massachusetts.

Although even the most sanguine advocates of the Truman Administration's health insurance program, exemplified by the Thomas-Murray-Dingell bill, do not expect its enactment in the present session of Congress, they are working intensely for victory in 1950. Steadily mounting public interest in budgetary, prepaid medical, dental and hospital care is interpreted by T-M-D supporters as the beginning of a "mandate" for compulsory insurance, fulfillment of which would prove useful in the Congressional and gubernatorial elections next year, in their opinion.

Federal Security Administrator Oscar R. Ewing, President Truman's chief lieutenant in the national health drive, returned to the wars on May 16 following protracted convalescence from a surgical operation. Speaking to a practical nurses' convention in New York City on that date, Mr. Ewing devoted his entire address to praise of the proposed system. He concluded:

"The American people as a whole are rapidly coming to understand what the argument is all about. They are making up their minds that national health insurance is what they want. And they are making up their minds that national health insurance is what they intend to have. And I have every conviction that they are going to get it."

Surprise Move

The mid-May announcement by Secretary of Defense Louis Johnson that he had established a Medical Services Division took many by surprise because of its suddenness, although the eventual creation of such a section was not unexpected. Speculation centered more on Mr. Johnson's prospective choice of a director for the division than on the effect which its establishment will have on the authority, not to say the prestige, of the uniformed heads of the three medical departments. The directive stated that the appointee may be either a civilian

or an officer of one of the armed services. But observers took it for all but granted that the post would go to a civilian.

High ranking officials of the Army and Navy dental services said they could do no more than speculate in what manner their operations and activities will be influenced by the superimposed division.

Legislation that would permit Army to do what Navy already is authorized to do, namely, commission women as officers in the Regular Dental and Medical Corps, is moving forward on Capitol Hill. Reported favorably by the House Armed Services Committee, the enabling bill (H.R. 4384) is expected to be enacted before adjournment of the present session.

Testifying before the committee to recommend the measure's adoption, Col. Paul I. Robinson, chief of Army medical personnel, said that recruitment of female physicians and dentists would help relieve a shortage that is steadily growing worse.

National Advisory Dental Research Council is scheduled to hold the second meeting since its establishment here on June 3. Actually it will be the first down-to-business session, the members having assembled previously only to discuss their statutory responsibility and to get acquainted with one another. The agenda will include a review of applications for research grants, scrutiny of the fellowship program and exchange of views on Federal aid to dental education.

The delay in final passage of the Federal Security Agency's 1950 budget, which contains funds for National Institutes of Health and the numerous grant-in-aid programs, may preclude immediate announcement of favorable action taken by the Council on grant applications.

Press Time FLASH . . .

The Department of the Army reported late last month to the Senate Armed Services Committee that it is opposed to the A.D.A. sponsored bill to provide parity of administration for the Dental Corps with the Medical Corps.

LEGISLATION

A.D.A. ATTACKS OMNIBUS M-W-D BILL AS "TOOL" OF COMPULSORY HEALTH ADVOCATES

In testimony prepared for presentation before the House Committee on Interstate and Foreign Commerce, May 25, an A.D.A. representative was to place the Association on record as opposing the recently introduced omnibus version of the Murray-Wagner-Dingell compulsory health insurance bill. This bill contains, in addition to CHI, proposals for increased federal aid to dental and medical education, hospital construction, research and operation of local health facilities.

Carl O. Flagstad, chairman of the Council on Legislation, was to tell the Committee conducting hearings on the two identical bills (H.R. 4312 and H.R. 4313) introduced by Representatives Dingell (D., Mich.) and Biemiller (D., Wisc.) that the A.D.A. would not consider the comparatively non-controversial aspects of the bill since they are being used as "tools to supplement" the compulsory health insurance effort.

Preparing the Congressmen for what

was to come later, the statement outlines dentistry's position in the fight to preserve the currently effective system of providing adequate health services for the American population. It points out that the A.D.A. represents more than 85 per cent of the nation's dentists and that through organized effort, the profession has made great strides during the last 100 years toward improving the "overall health of the patient." The fact that "dental diseases of one sort or another affect some 95 per cent of our population at one time or another in their lives" was to be presented to point up a statement on dentistry's recognition of its obligation to provide treatment "to as large a part of the population as is humanly possible."

Unwise Proposals

"H.R. 4312 and H.R. 4313 fall into the category of proposals which organized dentistry considers unwise," the statement said. "It proposes a system of so-called health insurance which must inevitably become 'State Medicine.' . . . This bill . . . [would compel] . . . persons to contribute to the cost of a program which cannot effectively be carried out. . . ."

Attacking what the backers of the measure call the pre-paid insurance aspect of compulsory health legislation, the statement will comment that "it lacks sound actuarial basis for the computation of premiums and benefits. By its very terms it provides that benefits may be limited by the National Health Insurance Board where 'personnel or facilities or funds that are or can be made available are inadequate.'" The administration's failure to provide a clear estimate of the "amount of funds which that appropriation would provide in relation to the probable costs of offering the various health services," also will be hit.

The statement emphasizes the contradictions in the measure by pointing out that free choice of physician, dentist, hospital or other health service is specified but that "this is an objective impossible of achievement within the necessary administrative limitations of the scheme."

A new note in compulsory health insurance testimony also will appear in the text when it is shown that the present bill "through oversight or otherwise . . . [fails] . . . to repeal, upon its effective date, the extremely costly medical, dental and hospital services presently offered under Veteran's laws for so-called non-service connected disabilities." This factor was seen as a possible political "bomb shell" in future discussion of the measure in the House.

"Another point which cannot be overlooked," the statement says, "is the formula set out in section 704 by which a determination of eligibility for benefits may be made. . . . Although there is no taxing provision in the bill it may reasonably be assumed that . . . [a person] . . . will contribute to the fund commencing with his first pay check in covered employment. But he will not be eligible for benefits for at least eighteen months after that day. This certainly is not insurance." Immediate coverage, except in a limited number of fields, is extended under all voluntary health insurance plans in operation today.

A Licensed Experiment

Lack of specific commitments in the bill will be scored in the testimony, which will additionally point out that "actually it amounts to little more than an appropriation coupled with a license to experiment along certain lines until such time as a firm baseline can be determined.

"The American people are entitled to know at the time of enactment of a law its probable effect and its proposed cost . . . neither of those can be ascertained under the pending bills."

Similar testimony is scheduled to be given May 25 before the Senate Commit-

tee on Labor and Public Welfare, the chairman of which is Senator Thomas (D., Utah), who sponsored the Senate version of the bill (S. 1679).

ILLINOIS LEGISLATORS TO GET DENTISTRY BACKED TAX BILL

The Illinois State Dental Association sponsored bill, designed to place a one mill per pound tax on refined sugar to provide funds for research into the field of dental caries, was to be introduced late last month into the state legislature.

If the measure passes, it is expected to bring between $650,000 and $700,000 in additional revenue to the state treasury. This would be turned over to the Illinois Department of Public Health.

Robert Kesel, of the University of Illinois, proposed the measure.

RESEARCH INSTITUTE FUNDS PASS SENATE; RETURN TO HOUSE

The proposed $2,000,000 A.D.A. backed building fund for the National Institute of Dental Research cleared its final hurdle in the Senate May 17 and was sent to the House of Representatives for action. The funds were contained in the full budget bill of the Federal Security Agency.

Held up originally in the upper house of Congress by a bi-partisan economy block, the appropriation was untouched after two trips to committee. It is reported that the entire measure may be placed before a joint Senate-House committee for further discussion and paring.

If passed by Congress, however, the $2,000,000 for the Research Institute will become available on July 1, the beginning of the federal government's fiscal year. First expenditures most likely will be for preparation of plans which are expected to cost in the neighborhood of $100,000. Actual building contracts probably could not be let before 1950.

A. D. A. AFFAIRS

NEW DENTAL HEALTH FILM AVAILABLE THROUGH A.D.A.

A new film emphasizing the three primary rules for good dental health is now available for loan through the A.D.A. Council on Dental Health, according to Allen O. Gruebbel, secretary. The film, titled "It's Your Health," was produced by and may be purchased from the Southern California Dental Association.

In commenting on the film which is a dramatization of a situation arising out of the rejection of an otherwise healthy young man by the U.S. Naval Academy because his oral health is poor, Dr. Gruebbel said its true value lies in the fact that it clearly establishes what must be done by every youth to assure good dental health. Major points covered in the film include (1) the importance of early and regular visits to the dentist, (2) the need for a well balanced diet and restriction of concentrated sweets and (3) good oral hygiene habits.

Preparation of three new pamphlets and a special booklet are among other current activities of the Council. The first pamphlet which will be completed soon is for public consumption and outlines currently accepted knowledge and methods for prevention and control of caries. New methods still under study also are discussed.

Another of the pamphlets is devoted to a series of questions and answers on dental health compiled from the inquiries most commonly received by the Council. The third pamphlet deals with orthodontics.

The new booklet is being planned as a guide book of facts for use by writers and in the schools. It is to be comprehensive in explaining basic dental services and various types of dental defects in both children and adults.

A.D.A. STUDENT MEMBERSHIPS HIT RECORD HIGH; TWELVE SCHOOLS ENLIST ALL DENTAL STUDENTS

As the school year approached its close this month, student membership in the A.D.A. reached a record total of 6,947, more than double last year's enrollment, according to Louis M. Cruttenden, assistant secretary of the Association.

Twelve of the nation's 39 accredited schools enlisted their entire eligible dental school classes as student members while eight others reported better than 75 per cent enrollment. Four of these schools had 95 per cent or better for a final score.

Meanwhile, Dr. Cruttenden announced that student members who are graduating this June will continue to be members for the remainder of the year and will continue to receive their JOURNALS by providing six cents postage for each issue and their home address. At present all JOURNALS are mailed in bulk to the dental schools and copies will be kept there for all members not desiring to have them sent home.

In addition, Dr. Cruttenden has asked all dental schools to supply the Central Office with a list of all senior dental students which will be retained until a change of address is received. A special change of address card is being sent to all the schools and when returned to the Central Office, THE JOURNAL will be mailed to the new address.

It is planned to contact all members who graduate this year after they have become established so that regular membership may be acquired.

A complete tabulation of this year's student membership by number and per cent of enrollment follows:

Dental Schools	Student Members	Per cent of Enrollment
Baylor University	233	97
College of Physicians and Surgeons	187	100
Creighton University	57	44
Emory University	231	77
Georgetown University	270	100
Harvard University	1	2
Howard University	22	13
Indiana University	225	89
Loyola University (Chicago)	318	100
Loyola University (New Orleans)	148	100
Marquette University	316	100
Medical College of Virginia	166	95
Meharry Medical College	21	18
New York University	466	84
Northwestern University	153	43
Ohio State University	288	81
St. Louis University	118	48
State University of Iowa	78	44
Temple University	456	100
Tufts College	79	24
University of Buffalo	61	35
University of California	97	48
University of Detroit	197	100
University of Illinois	65	30
University of Kansas City	411	100
University of Louisville	221	100
University of Maryland	188	60
University of Michigan	123	40
University of Minnesota	64	20
University of Nebraska	113	100
University of Oregon	295	100
University of Pennsylvania	305	70
University of Pittsburgh	125	37
University of Southern California	186	38
University of Tennessee	52	17
University of Texas	193	100
University of Washington	144	100
Washington University	122	78
Western Reserve University	196	100
Columbia University*	7	
Interns	9	
TOTAL	6,947	

*Unaccredited School. Former Junior Members.

JUNE AND EARLY JULY TO BE FILLED WITH COUNCIL MEETINGS

Six A.D.A. Councils will meet at the Central Office during June and early July preparatory to sending a representative to the annual session in October.

The Council on Dental Education, headed by J. Roy Blayney, of Chicago, will begin on July 2 to discuss current legislation for providing federal aid to dental schools and will move on, according to Shailer Peterson, Council secretary, to discussions of the Council's plan to conduct a survey of the financial condition of the nation's 39 accredited dental schools. The meeting will end July 3.

Other major issues on the agenda include formation of a timetable on which the Council's aptitude testing program may be installed throughout the country. It is estimated that all approved schools should have such a program in operation by late 1950 or early 1951.

Accreditation and inspection of schools of dental hygiene will be covered following the Council sponsored conference with representatives of the dental hygienist group. Provision is made for discussion of the present dental intern program and Edward C. Dobbs, of Baltimore, chairman of the Council on Hospital Dental Service, will be present.

The first specific and detailed program suggested by an American specialty board for training its candidates also is a priority topic. The program was prepared by the American Board of Oral Surgeons.

Dental Health

Expansion and improvement of A.D.A. dental health services will be an important issue when the Council on Dental Health, chairmaned by Leo J. Schoeny, of New Orleans, meets July 9-11. Other points to be covered, according to Allen O. Gruebbel, Council secretary, will involve the development of plans for continuing National Children's Dental Health Day so that preparation of educational material and visual aids to stimulate interest may be undertaken.

Plans for the extension of dental care proposed by such agencies as Blue Cross, Blue Shield, labor organizations and others will occupy a prominent position in the discussions, it was stated. These plans will be considered in comparison with proposed federal and state government plans.

The Dental Corps

While no definite program has been released by Rudolph H. Friedrich, of Plainfield, N. J., chairman of the Council on Federal Government Dental Corps, it is believed that an important topic at that meeting, June 16-18, will be the result of a meeting held recently with the heads of several government dental corps.

Relief Fund

Discussions on how to improve operation of the A.D.A. Relief Fund will be held June 23 when the Council on Relief meets under the chairmanship of John S. Owens, of Camden, N. J. Receipts from this year's fund raising drive reached $59,963.69 on May 15.

Hospital Service

Increased activity within the hospital and internship training programs now under way will present a series of problems for discussion by members of the Council on Hospital Dental Service when they meet June 29 under the direction of Chairman Dobbs. Five Navy installations recently were approved for dental intern training.

July 17-18 have been set as dates for a meeting of the Council on Dental Trade and Laboratory Relations, F. W. Herbine, of Reading, Pa., is chairman.

A.D.A. COUNCIL ON EDUCATION APPROVES NAVY INTERNSHIPS

The Navy's dental internship program being conducted at four naval hospitals and the National Naval Medical Center has been approved by the A.D.A. Council on Dental Education, according to Shailer Peterson, Council secretary.

Hospitals approved for the training are located at Great Lakes, Ill., Philadelphia, St. Albans, N. Y., San Diego, Calif. and Bethesda, Md.

MANAGEMENT CONFERENCE TO FEATURE PUBLIC RELATIONS

The second State Secretaries' Management Conference to be held by the A.D.A., June 13-15, at the Central Office, will be devoted to discussions of public relations and its application to dentistry, according to Louis M. Cruttenden, assistant secretary of the Association.

A series of projects now being conducted by state dental societies will be presented showing how state organizations plan and carry out good dental public relations. The general fields of endeavor to be discussed and the speakers scheduled include: dental society membership, by James Robinson, executive secretary, Southern California State Dental Association; auxiliary services, by Charles A. Wilke, secretary, State Dental Society of the State of New York; publicizing state dental society activities, by T. T. McLean, executive secretary, Tennessee State Dental Association; public service programs, by John G. Carr, secretary, New Jersey State Dental Society; the promotion of research foundations, by Carl V. E. Cassel, secretary, Minnesota State Dental Association; promotion of National Children's Dental Health Day, by Ray Cobaugh, executive secretary, Pennsylvania State Dental Society and the use of dental health education material, by Edgar T. Stephens, of the Chicago Dental Society.

Lars Carlson, district representative of the Oil Information Committee and Kenneth Ward, vice-president of J. Walter Thompson Co., national advertising and public relations organization, will speak on public relations in general. They will be aided by L. T. Maloney, assistant to the president of the Massachusetts Dental Society. Among members of the central office staff on the program will be H. B. Bain, director of the Bureau of Public Information. Members of the Advisory Committee to the Bureau will be present in addition to an expected attendance of some 25 state society secretaries.

W. H. WAITE IS NEW ASSISTANT OF DENTAL EDUCATION COUNCIL

W. H. Waite

The appointment of William H. Waite, of Moorhead, Minn., as assistant secretary of the A.D.A. Council on Dental Education has been announced by Harold Hillenbrand, secretary of the Association. The position had been open since the appointment last fall of Shailer Peterson to succeed Harlan H. Horner as Council secretary.

In his new post, Dr. Waite will assist Dr. Peterson conduct a number of projects already under way and it is expected that particular attention will be given a forthcoming survey of the financial condition of the nation's dental schools. He will assume his duties on June 15.

Taking his A.B. at the University of

Saskatchewan in 1929, the new assistant secretary acquired a M.Ed. from the University of Manitoba in 1936 and a Ph.D. in psychology from the University of Chicago in 1940. He also studied at Northwestern University. Dr. Waite has served in a variety of teaching positions and most recently was dean of State Teachers College, in Moorhead.

In addition to being a member of a number of local education associations, he holds memberships in several national organizations.

INTEREST IN USE OF DENTAL HYGIENISTS SHOWS INCREASE

Increased interest in the use of dental hygienists as auxiliary personnel in dentistry was registered recently when 10 states passed dental hygienists legislation and the A.D.A. Council on Dental Education advanced its program of inspection and accreditation of dental hygienist schools.

A conference is to be conducted by the Council on June 30-July 1, in Chicago, for some 50 representatives of the American Dental Hygienists' Association and the American Association of Dental Schools in an effort to discuss certain aspects of dental hygienist education, according to Shailer Peterson, Council secretary. The meeting will take place at the Drake Hotel.

Stating that the discussions will be advisory in nature, Dr. Peterson added that deans of dental schools, educators from dental hygienist schools as well as the hygienists themselves will be given an opportunity to present all sides of the subject. Curriculum will be an important topic in the discussions.

While it is not yet clear what effect the new hygienist laws will have on the educational picture, it is generally agreed that they serve to clarify the position of the dental hygienist in practice.

Among the states which have passed new measures are Georgia, Nebraska, Idaho, New York, South Dakota, New Hampshire, Oregon, Pennsylvania, Vermont and Utah.

COPIES OF TWO PUBLICATIONS SOLICITED BY THE JOURNAL

Copies of THE JOURNAL for January, 1948 and for the *Journal of Oral Surgery* for January, 1948 and January, 1949 are being solicited by the A.D.A. business office, according to John J. Hollister, business manager. Those holding extra copies of the issues involved are requested to send them to The Journal of the American Dental Association, 222 E. Superior St., Chicago 11.

PLANS FOR FIRST A.D.A. DENTAL LIBRARY CONFERENCE COMPLETED

Plans have been completed for the first A.D.A. sponsored conference on dental library, indexing and nomenclature problems to be held June 27, at the Central Office, according to Donald A. Washburn, director of the Bureau of Library and Indexing Service.

Representatives of dental school libraries from across the nation are expected to attend, he said while outlining the program. John Gurley, chairman of the Bureau, will talk on the scope and objectives of the conference; Shailer Peterson, secretary of the Council on Dental Education, will speak on libraries in dental schools of the United States; Dr. Washburn will discuss the A.D.A. library and dental school libraries; Margaret G. Palmer, dental school librarian, University of Pennsylvania, will talk on the development of a Union Card Catalog of dental library holdings; and Helen Hlavac, New York University dental school librarian, will discuss the Black classification system.

Martha Mann, indexer for the Bu-

reau, will speak on operation of the present indexing service; Eli Garrison, industrial consultant, will talk on new reproduction technics for an indexing service; Madeline Marshall Nabor, Northwestern University dental school librarian, will discuss increasing the scope of service of the A.D.A. index and Breed Robinson, University of Maryland dental school librarian, will talk on problems in dental nomenclature. The meeting will be presided over by Thomas A. Speidel, of the University of Minnesota dental school and Dr. Washburn.

DENTAL SOCIETIES

STATE DENTAL SOCIETIES HOLD MEETINGS; NEW DENTAL SCHOOL AMONG PROPOSALS AIRED

The interest of dentists attending the recent Arkansas State Dental Association annual meeting, at Little Rock, centered on the prospect of a new dental school which may be constructed there. Governor Sid McMath, sponsor of the plan, said the school would follow a proposed state medical center in priority.

Honored guests at the meeting included Clyde E. Minges, A.D.A. president and Harold Hillenbrand, A.D.A. secretary. Daniel F. Lynch, of Washington, D. C., A.D.A. trustee, was among clinicians on the program.

New officers elected at the meeting include: Douglas Lewis, McGehee, president; H. M. Flickinger, Siloam Springs, president-elect; Roy Bucy, Rector, vice-president. Don H. Hamm, Clarksville, was re-elected secretary-treasurer.

Elsewhere in the nation other state dental societies met and elected officers. They include:

California.—Clyde C. Sheppard, Berkeley, succeeded Harry Hambly, San Francisco, as president. New officers elected are Will G. Sheffer, San Jose, president-elect; Francis J. Herz, San Francisco, vice-president; Lawrence R. Ludwigson, San Francisco, secretary and Howard M. Johnston, Berkeley, treasurer.

Massachusetts.—J. Murray Gavel, Boston, was installed as president to succeed Herbert I. Margolis, also of Boston. Others elected are William C. Marx, Holyoke, president-elect; Frederick A. Trevor, Melrose, vice-president; Arno M. Bommer, Revere, secretary; Harold E. Tingley, Boston, assistant secretary; Glenn W. Lawrence, Boston, treasurer; Fred R. Blumenthal, Boston, assistant treasurer and Cedric F. Harring, Brookline, editor.

Mississippi.—O. L. Colee, Magnolia, was succeeded as president by Lel J. Smith, Biloxi and G. A. McCarty, Jackson, was elected president-elect. F. C. Sneed, Osyka, was elected secretary-treasurer.

Missouri.—Roy L. Felkner, Kansas City, succeeded E. B. Owen, St. Louis, as president. E. E. Haverstick, St. Louis, was elected president-elect. Vice-presidents elected are W. W. White, Kansas City; D. W. Brock, St. Louis, and Paul Grisham, Cape Girardeau. Others elected include Reuben R. Rhoades, Jefferson City, secretary-treasurer and Bates Hamilton, Kansas City, editor.

New Jersey.—The new president is J. Ward Weaver, Pleasantville, who succeeds Charles P. Crowe, East Orange. Guy H. Hillman, Plainfield, was elected president-elect and John G. Carr, Camden, was re-elected secretary. Stephen M. Lyons, Summit, is treasurer.

Oklahoma.—The Oklahoma State Dental Association reports a record attendance at their recent annual meeting. The total

reached 381 members and 366 others including hygienists and assistants. R. M. Dunn, Tulsa, ascended to the presidency succeeding David W. Matteson, Oklahoma City. Officers elected include Fred O. Pitney, Oklahoma City, president-elect; Fred E. Sims, Tulsa, vice-president and F. H. Binkley, Hennessey, secretary-treasurer.

Essayists at the meeting were Harold Hillenbrand, A.D.A. secretary; Willard Ogle, Dallas, Texas, A.D.A. trustee; Kenneth A. Easlick, University of Michigan; Morris J. Thompson, Beverly Hills, Calif., and Wallace N. Kirby, Downers Grove, Ill.

Wisconsin.—H. M. Uebele, Milwaukee, succeeds A. H. Finke, Sheboygan, as president. Others elected are Glenn Bennett, Wisconsin Rapids, president-elect; O. M. Dresen, Milwaukee, first vice-president; F. J. Murphy, New London, second vice-president; R. A. Mason, Milwaukee, secretary and C. P. Collins, Kenosha, treasurer.

Maryland.—Daniel Shehan, Baltimore, has been succeeded by B. Sargent Wells, also of Baltimore, as president. Those elected are Roger S. Schlosser, Hagerstown, president-elect and Max Baklor, Baltimore, vice-president. The secretary and treasurer, respectively, E. L. Pessagno and Samuel H. Bryant, both of Baltimore, were re-elected.

Illinois.—Glenn E. Cartwright, Chicago, succeeds John W. Green, Springfield, as president. Newly elected are Walter J. Gonwa, Chrisman, president-elect and Louis F. Tinthoff, Peoria, vice-president. Paul Clopper, Peoria, was re-elected secretary as was Melford E. Zinser, Chicago, treasurer.

JOINTLY SPONSORED DENTAL HEALTH CONFERENCE HELD

The second annual dental health conference, jointly sponsored by the University of Pittsburgh school of dentistry and the Odontological Society of Western Pennsylvania, was held recently at Pittsburgh.

The conference concerned itself largely with discussions of the prevention and control of caries and the extension of dental care. Subdivisions of these two broad subjects included nutritional and oral environment factors, topical applications of sodium fluoride and other agents, dental care for the low income groups, industrial dentistry, labor health programs, city health programs and economic factors that influence distribution of dental service.

COMBINED DENTAL MEETING TO BE HELD IN PITTSBURGH

The combined meeting of the Pennsylvania State Dental Society and the Odontological Society of Western Pennsylvania will be held June 1-3, in Pittsburgh.

A full scientific program for the meeting will include sections on the following subjects: periodontia, roentgenology, crown and bridge, operative technic, endodontia, ceramics, prosthesis, orthodontia, cancer and oral surgery.

ILLINOIS DENTAL SOCIETY IS SPONSORING SPECIAL TRAIN

A special train to the A.D.A. annual session, Oct. 17-20, in San Francisco, is being sponsored by the Illinois State Dental Society, according to Paul W. Clopper, secretary. The train will leave Chicago Oct. 12 and return Oct. 26.

Enroute the train, equipped with one of the Burlington Route's new "vista-dome" cars, will stop at Colorado Springs, Royal Gorge, Salt Lake City and Elko, Nev. The trip is designed to include the "best" features of the Colorado Rockies and California's Feather River Canyon where the gold rush of '49 began. The return trip will begin Oct. 21

and includes a two-day stop in Los Angeles.

Passengers will have their choice of three arrangements and further information may be secured by writing W. M. Moloney, G.A.P.D., Burlington Route, 105 W. Adams St., Chicago 3. A detailed folder on the trip is available.

An additional tour is available to Hawaii through the Illinois travel arrangement as well as through a plan proposed by E. L. Ball, of Cincinnati, president of the American Academy of Periodontology.

Dr. Ball has made arrangements with Provident Travel Service of the Provident Savings Bank and Trust Company, Cincinnati, for three separate trips ranging in length of time from 15 days to 27 days. For additional information write Dr. Ball, Doctor's Building, Cincinnati.

NORTH CAROLINA DENTISTS HONOR PRESIDENT C. E. MINGES

A special testimonial banquet in honor of Clyde E. Minges, president of the A.D.A., was held May 20, in Pinehurst, N. C., by the North Carolina Dental Society, according to C. W. Sanders, Society president.

Among the guests who accepted invitations to the affair were Senator Lester C. Hunt, (D., Wyo.) and Mayor Edwin F. Duke, of Rocky Mount, N. C., Dr. Minges' home town. Wilbert Jackson, member of the A.D.A. Council on Dental Education, was toastmaster and Walter T. McFall, president-elect of the North Carolina Dental Society, gave the invocation. H. O. Lineberger, member of the A.D.A. Judicial Council, presented the president's emblem.

Speakers on the program included Philip E. Blackerby, director, division of dentistry, W. K. Kellogg Foundation; S. Robert Horton, and C. C. Poindexter, past-presidents of the North Carolina Dental Society; State Senator Paul E. Jones; Harry Lyons, chairman of the A.D.A. Committee on National Emergency Dental Service; LeRoy M. Ennis, A.D.A. trustee and Harold Hillenbrand, A.D.A. secretary. Guy R. Harrison, of Richmond, Va. and R. Fred Hunt, secretary-treasurer of the North Carolina Dental Society, made special presentations.

AMERICAN DENTISTRY IS TOPIC AT TEMPLE DENTAL MEETING

The problems and resources of American dentistry were discussed recently by Harold Hillenbrand, A.D.A. secretary, when he appeared on the first "Junior A.D.A. Day" program held by the dental school students at Temple University.

Under the guidance of Gerald D. Timmons, dean of the dental school, the students presented a day-long program of scientific papers and discussions. Those charged with developing the program included Robert Williams, president; Paul Buckley, first vice-president; Charles Nagle, second vice-president; Gene Munchak, treasurer; S. Eugene Cohen, program chairman; Martin Bonda, publicity chairman; Stanton Teitelman, art director and Gerald Rossnick, banquet chairman. A special printed program was prepared for the meeting.

LICENSURE EXAMINATION IN FLORIDA SCHEDULED FOR JULY

The Florida State Board of Dental Examiners will hold its next examination for licensure in dentistry and dental hygiene at Jacksonville, July 11-16, according to A. W. Kellner, secretary-treasurer, of Hollywood, Fla. Dentists must file preliminary applications by May 11 and final applications for both dentists and hygienists must be complete by June 16.

During the recent annual meeting of the Arkansas State Dental Association, Governor Sid McMath (center) made Clyde E. Minges, A.D.A. president (left), and Harold Hillenbrand, A.D.A. secretary (right), honorary "Arkansas Travellers." Looking on are W. R. Alstadt, of Little Rock, a consultant to the A.D.A. Council on Legislation (right), and Don M. Hamm, of Clarksville, secretary-treasurer of the Arkansas Association.

DENTAL EDUCATION

TELEPHONE DENTAL COURSE ATTRACTS SEVENTY SOCIETIES

Following announcement by the University of Illinois college of dentistry of its proposed telephone transmitted extension course on "current advances in dentistry," a total of 70 dental societies in 30 states indicated interest in participating, a release from Saul Levy, chairman of the postgraduate extension program states. The 70 societies have a combined membership in excess of 13,000.

The course, scheduled to begin this fall, will present six round table discussions and symposia during the months of October and November. Additional programs are planned for the first four months of 1950. Faculty for the programs is being recruited from all parts of the country and will consist of well-known dental specialists.

Cost of the six panel course will be $10 per member, according to Dr. Levy who stated that the course is expected to be especially helpful to dentists in rural areas and small communities. Each series will be transmitted over lines of the American Telephone and Telegraph Company and channeled to all participating dental societies. The lecturer's voice then will be magnified over a loud speaker system. All additional material such as slides used in the course will be mailed to the society before the program.

The tuition fee, Dr. Levy said, will include all telephone charges, a syllabus for each member containing detailed outlines and references on each subject, and photographs and biographies.

Dentistry in the occupied countries of Japan and Germany has seen a marked increase in the number of women entering the profession. In the top photo a group of Japanese dentists and dental technicians operate in an Army dental clinic. They are used to alleviate the shortage of American trained dentists and auxiliary personnel in the occupation forces. The bottom photo shows a class of German dental students studying at the Free University of Berlin in the Western Sector. Of the dental school's total enrollment more than a third are women.—*Acme Photo. U.S. Army Photo.*

ARMY AND NAVY

ARMY APPEALS TO RESERVE DENTISTS, PHYSICIANS FOR AID; MEDICAL UNIFICATION PRESSED

Dentists, physicians and veterinarians who are members of the Army reserve corps will be requested soon to serve part-time at military installations throughout the country, according to a recent statement by Maj. Gen. Raymond W. Bliss, Army surgeon general. This action comes at a time when the Armed Forces campaign to recruit professional personnel has been in operation for nearly six months.

At last report the campaign, known as "operation moral suasion" and directed particularly at former A.S.T.P.'s and V-12's who received all or part of their education at government expense but who did not see active service, had netted a total of only about 300 volunteers, or 3.6 per cent of the potential. This response was precipitated largely through a "personal" letter sent to nearly 15,000 dentists and physicians by former Secretary of Defense James E. Forrestal.

Gen. Bliss will send questionnaires to some 14,300 physicians, 5,548 dentists and 1,372 veterinarians to determine who could volunteer for service from one to 29 days a month.

Local dental and medical societies have been sent a request by the new secretary, Louis A. Johnson, asking them to follow up each of their members in the potential volunteer category. No official report on the effect of the request has been made but it is believed that local chairmen are cooperating.

The shortage of medical and dental personnel also is being attacked legislatively. Two new bills introduced into the House hit the problem from opposite angles—one calls for commissioning women physicians and dentists and the other permits an increase in the number of Navy Dental Corps captains on active duty.

Meanwhile an A.D.A. sponsored bill to create parity of administration for the Army Dental Corps with the Medical Corps remains lodged in committee. It is reported that a complete overhaul of the medical and dental establishments within the Armed Forces is being considered by top officials in the Department of Defense.

In line with this thinking, Secretary Johnson recently issued a directive ordering unification of administration and operation of all Armed Forces medical services. He also established a "medical services division" within the Office of the Secretary of Defense.

A Single Authority

Provision is made in the directive to appoint a director of medical services who will be responsible for (1) the "establishment and control of general policies, standards and programs for the Medical Services of the three military departments and appropriate agencies of the National Military Establishment"; and (2) to "exercise general direction, authority and control over administration and utilization of personnel and facilities of the Medical Services of such departments and agencies." The appointee probably will be a civilian.

The directive also authorizes a separate medical department for the Air Force but no mention is made of what arrangements may be made with the Dental Corps of the Army and Navy to supply additional personnel. Each of

those two branches of the Armed Forces has been ordered to transfer 100 medical officers to the Air Force under the new plan.

Maj. Gen. Malcolm C. Grow, the air surgeon, is in charge of the new medical agency which differs from the old arrangement in that the Army then supplied medical and dental services for the airmen. It is expected that the three departments will continue operation about as before.

NEW ARMY PROPOSAL SEEKS EFFICIENT USE OF PERSONNEL

A proposal to streamline war-time military hospitals overseas as a method of cutting down on "the idleness of valuable personnel" has been announced by Army Surgeon General Raymond W. Bliss.

Aimed particularly at stepping up the efficiency of handling dentists, physicians and nurses, the proposal calls for a "split between equipment and administrative (or non-professional personnel) on the one hand, and professional personnel on the other." This arrangement is supposed to reduce the number and type of medical organizations in the Army.

A release from the Army states that under the new plan, approved in principle by the general staff, the professional complement will not join the unit until the last practical moment. In this way, the release says, "the personnel in scarce categories (dentists, physicians and nurses) will be available for use at other installations, or may even remain longer in the civilian community, until the time when they are actually needed."

RESEARCH

H. T. DEAN IS FIRST DENTIST TO RECEIVE GORGAS AWARD

H. T. Dean

For the first time in its history, the Association of Military Surgeons of the United States has conferred its Gorgas Award "for outstanding contributions in the field of military medicine" on a dentist. The recipient is H. Trendley Dean, dental director of the U.S. Public Health Service and director of the National Institute of Dental Research.

Sponsored since 1941 by the Philadelphia pharmaceutical manufacturer, Wyeth, Inc., the award consisting of a silver medal, a scroll and $500 will be presented to Dr. Dean at the Association's annual banquet in November.

Active in the Public Health Service since 1921, Dr. Dean has for many years specialized in the epidemiological study of dental diseases and was appointed the first director of the National Institute of Dental Research shortly after it was created in 1948 by Congress. He is past president of the Association of Military Dental Surgeons and of the International Association for Dental Research and a member of the A.D.A.

NEARLY $1-MILLION APPROVED FOR CANCER RESEARCH GRANTS

Grants for cancer research totalling $990,505 were approved recently by the National Cancer Institute, according to the Federal Security Administration.

PUBLIC HEALTH

HEALTH OFFICERS, NURSES TO HOLD 45th CONFERENCE

The 45th annual Conference of Health Officers and Public Health Nurses, sponsored by the New York State Department of Health and the State Health Officers Association, is expected to attract many of the nation's public health leaders as speakers and participants, according to State Health Commissioner Herman E. Hilleboe. This meeting is one of the oldest and best known in the country and this year will be held at Lake Placid, N. Y., June 20-23.

MONTANA CREATES POSITION FOR DENTIST ON HEALTH BOARD

Public health dentistry in Montana was advanced recently when the State Legislature passed a law creating a new State Board of Health with a dentist member.

The new Board is made up of three members from the general public, three physicians and a dentist replacing the old Board arrangement of five physicians, a pharmacist and a food distributor.

Under the new arrangement, a division of dental health is created. It will work in cooperation with the Montana State Dental Association's council on dental health.

STATE HEALTH DEPARTMENTS ADVANCE DENTAL PROGRAMS

Dental programs of state public health agencies advanced in 1947 and 1948 but considerable variations in the intensity of activity among the state programs remain, a report from the records and reports section of the U. S. Public Health Service discloses.

The report, covering the two years, shows that while state health agencies planned to employ 155 dentists in 1948, 68 positions were unfilled in January of this year. It also states that 46 state agencies provided dental services in 1947, 40 states planned expansion of dental services in 1948 and four states were to initiate new services.

Emphasis placed on dental services by state health officers during the fiscal year of 1947 shows that two gave dental service major emphasis, 26 intermediate emphasis and 18 minor emphasis. Seven reported no dental activity.

Increases in dental service were registered in 24 state health departments while three showed no change, seven reported decreases and seven reported no activity. A total of 87 dentists was employed full-time during the 1947 period.

CALLS ISSUED FOR DENTAL HYGIENISTS IN TWO AREAS

Openings for dental hygienists are available in New York and San Francisco, and similar positions are expected to be available soon in Idaho where the state legislature recently passed a dental hygienist law.

Harry Strusser, director of the New York Department of Health bureau of dentistry, reports that 40 positions are now available for qualified dental hygienists interested in public health work at a salary of $2,160 a year. A total of 25 days is allowed for vacation with additional time alloted for sick leave. Also provided for are pensions and automatic salary increases.

The New York Civil Service Commission now is accepting applications, he states. No written examination is necessary but candidates will be called upon for a performance test. Application blanks are available from the Department of Health, bureau of personnel, 125 Worth St., Manhattan, or at the Civil Service Commission, 96 Duane St., Manhattan.

The City and County of San Francisco also is seeking a dental hygienist at a starting salary of $270 a month which later may be raised to a maximum of $330. Residence requirements have been waived by the Civil Service Commission.

Calls for dental hygienists to practice in Idaho are expected as soon as the new law permitting them to practice in dental offices, state institutions, hospitals and school programs is effective.

In commenting on the new law, Hugh B. Colver, of Boise, chairman of the Idaho State Dental Association legislative committee, said: "Legislators recognized the necessity for bringing our laws up to date and approved recommendations for modernization made by the State Dental Association."

GENERAL NEWS

BRIG. GEN. W. D. LOVE IS NOMINATED FOR PROMOTION

Brig. Gen. Walter D. Love, deputy chief of the Army dental division, has been nominated by President Truman for promotion to the permanent grade of major general. The Senate must now confirm the appointment.

A graduate of the University of Pittsburgh dental school, Gen. Love joined the Army as a Reserve officer in 1918, three years after leaving school, and was commissioned a regular officer in the Dental Corps in 1920. Before World War II he served in various posts both here and overseas and became chief of dental service for a 2,000-bed general hospital in the China-Burma-India theatre in 1944. He was assigned to the Surgeon General's office, in Washington, in 1946. He is a member of the A.D.A., the American College of Dentists and the Association of Military Surgeons.

EDUCATION AND RESEARCH TO BE SUBJECTS OF TWO MEETINGS

Two major organizations, the American Association of Dental Schools and the International Association for Dental Research, will meet in Chicago, late this month.

The A.A.D.S. annual meeting will be held June 27-29, at the Drake Hotel and the scientific program will begin with a report on the teaching of orthodontics, according to John E. Buhler, dean of Emory University dental school and secretary-treasurer of the organization. A series of special conference sessions are scheduled in addition to a general session devoted to recruiting, preparing and improving dental teachers. A roundtable luncheon also is planned and the annual dinner will be held the evening of June 27.

The I.A.D.R. will present a full program of scientific papers at its meeting also to be held in the Drake, June 24-26. E. H. Hatton, of Northwestern University dental school, is secretary.

MEDICAL-DENTAL CARE PLAN COSTS FIVE PER CENT OF WAGES

At a cost of five per cent of their wages some 9,000 persons in St. Louis are receiving complete medical care and limited dental care for their families under a program operated by the Labor Health Institute, a non-profit, Missouri corporation.

Information on the Institute's care plan which includes complete dental care at cost, was forwarded recently to the A.D.A. Council on Dental Health by the St. Louis Dental Society. The plan has a potential capacity of about 25,000 families.

Confined to contracts between labor and business groups, the Institute plan entitles members to complete physical and dental examinations, including chest

and full mouth x-rays. Treatment is provided by staff personnel as part of the plan with the exception of prescriptions and such dental restorative services as fillings, bridges and dentures which are available at cost. There is no limit to the amount of service extended to the individual family in any one year.

The Pay Scale

Thirty-four physicians and dentists comprise the staff. Each staff member works on a part-time basis on the following pay scale:

22 hours per week . . . $375.00 per month
20 hours per week . . . 350.00 per month
18 hours per week . . . 325.00 per month
13 hours per week . . . 175.00 per month
9 hours per week . . . 115.00 per month
6 hours per week . . . 200.00 per month
(for consultants and experts)

AMERICAN ACADEMY OF DENTAL MEDICINE TO MEET IN JUNE

The annual meeting of the American Academy of Dental Medicine will be held June 4-5, in New York, according to William M. Greenhut, national secretary. A symposium and round table discussions on psychosomatics are to be features of the program. Reservations may be secured by writing Dr. Greenhut, 124 E. 84th St., New York 28.

A.D.A. TRUSTEE PARTICIPATES IN CHI DEBATE BROADCAST BY MBS

A debate on compulsory health insurance, sponsored by the Cincinnati Dental Society and the Cincinnati Post, attracted some 15,000,000 listeners on May 8, according to officials of Mutual Broadcasting System whose facilities were used for the broadcast.

Harold Oppice, A.D.A. trustee from Chicago, was among the participants in the debate which included Paul Hawley, chief executive officer of Blue Cross and Blue Shield Plans; Congressman Andrew Biemiller, (D., Wisc.), and Lester Velie, of New York, associate editor of Colliers.

Dr. Oppice said in part: "Compulsory health insurance is not the solution to our American health problem any more than it is proving a solution in Great Britain or any other country that has embraced it."

R. H. MURPHY, DENTAL EDITOR AND SECRETARY, SUCCUMBS

R. H. Murphy

R. H. Murphy, secretary of the Georgia State Dental Association for 15 years and editor for the last four years of that organization's *Journal,* died suddenly April 25, following an operation on a ruptured esophagus. He died of acute nephritis.

Dr. Murphy, a native of Augusta, Ga., received his dental degree from Emory University dental school in 1922 and later studied under Olin Kirkland, of Montgomery. He had devoted about 15 years to the practice of periodontia.

Upon assuming the secretaryship of the Association, Dr. Murphy became instrumental in doubling its membership and initiating a program of dental public relations in his state. He was chairman of the procurement and assignment committee for Georgia throughout the war, and was first president of the Central District Dental Society. He also was active in establishing the R. Holmes Mason Memorial Clinic, held in Macon annually.

BOOK REVIEWS

Horace Wells, Dentist, Father of Surgical Anesthesia. Compiled by the Editor for the Horace Wells Centenary Committee of the American Dental Association. First edition. xiv + 415 pages, with 12 illustrations. Index. Price $5.00. Chicago: American Dental Association, 1948.

Because of war restrictions, the centenary of Horace Wells' discovery (1944) was celebrated in countless memorials throughout the world instead of in one central meeting. The present handsome and attractive volume is a collected account of these various celebrations. It includes the International Wells Centenary Celebration at Hartford, Conn., the many other memorial exercises in France, England, and the countries of Latin America, as well as radio broadcasts, newspaper comments, etc. Like any such memorial volume, it rightfully contains much repetitive matter, names, and details, which, though not always of general interest, gratify the many participants. Among the many discussions of Wells and his work, the general reader will find brief articles with a variety of interesting viewpoints.

In addition, this volume contains considerable material relative to other phases of the history of anesthesia, both new and old, not easily accessible elsewhere. Among the most informative articles, there are several especially worth reading. E. A. Rovenstine has contributed a paper on "Nitrous Oxide: Highlights and Sidelights," which deals with the whole history of that anesthetic. Theodor Blum relates the "Contemporary History and Use of Local Anesthesia in Oral Surgery." Arno B. Luckhardt gives an interesting account of "Edmund Andrews, M.D., and His Nitrous Oxide-Oxygen Mixture" while Samuel C. Harvey comments on "The Effect of the Introduction of Anesthesia upon Surgery."

Particularly useful for the student of the history of anesthesia are the bibliographical appendices listing Wells memorabilia held in the Connecticut State Library, the Library of the Hartford Medical Society, the Library of the Hartford Dental Society, the Library of the Baltimore College of Dental Surgery, and the Library and Museum of the University of Pittsburgh. These collections are rich in manuscript, newspaper and documentary material, as well as portraits and other museum items.

Editing of the work has been done with the meticulous attention to accuracy and detail characteristic of everything undertaken by Dr. Gies.—*George B. Denton.*

Your Teeth and How to Keep Them. By Jerome J. Miller, D.D.S. 232 pages with 45 illustrations. Index and glossary. Price $3. New York: Lantern Press, 1947.

It is a novel experience to read a book written in nontechnical language and devoted entirely to the general subject of dental health. A review of book catalogs revealed that few books of this character have been published. The appearance of this volume on the market is indicative of the growing interest of the public in mouth health.

Most dentists will react sympathetically to the author's prefatory statement: "For many years I pondered the wisdom of an undertaking such as this. On the one hand I was encouraged to venture it by an awareness of the crying need of the people for adequate dental care. And not care alone—they needed to be informed and aroused to the simple, elementary rules that make for healthy teeth. On the other hand, there was the fear that it would be difficult to write such a semi-technical work at a level that all would pleasantly assimilate and not find extremely tiring."

The author obviously realized the handicaps with which he was faced in presenting his subject, as have many others who have written dental health education material. For instance, dental diseases are not as dramatic as many other diseases. It is more difficult in this field, therefore, to appeal to the emotions than it is when one writes about cancer and cardiac or communicable diseases.

Most dentists also will appreciate the author's difficulty in writing about the cause and effect of dental diseases and anomalies when so little acceptable scientific knowledge is available about many of them. In at least one respect the author had an advantage in preparing his manuscript in that he was not

compelled to supply references or other documentary proof for his statements. This freedom from the rules of scientific reporting permitted him to express personal opinions on such controversial issues as the relation of dental disease to general health and the importance of diet to dental health.

Dentists who demand strict adherence to only so-called facts that are substantiated by adequate scientific evidence will be critical of many passages in this book. Others will be more lenient because they believe that personal opinions, based on clinical observations, are acceptable for health education purposes when scientific proof is lacking.

Health educators and teachers who have read the book have stated that it is excellently adapted for use as a teaching guide and for reading assignments. It is suggested, therefore, that health education committees of dental societies recommend that it be placed in high school and college libraries.—*Allen O. Gruebbel.*

Medicine in the Changing Order. Report of the New York Academy of Medicine Committee on Medicine and the Changing Order. 240 pages. Index. Price $2. New York: The Commonwealth Fund, 1947.

This book should be required reading for every dentist in America and others interested in providing more adequate health care to the nation. It traces the development of medicine and dentistry in relation to social conditions and needs, draws conclusions and offers pertinent recommendations. It is important that the dental profession understand the unbiased facts and become aware of the many avenues of approach in alleviating the health problem of America.

The book is timely because it furnishes valuable information on the proposed compulsory health insurance legislation. It is a report on the findings of four years study and investigation, and its objective, as defined in the introduction, is all embracing.

The sequence of material is logically grouped. Beginning with "Origins of Present Problems in American Medicine," it presents the crux of the health problem today in these lines: "The mounting costs of medical practice confront the public in the shape of fees charged by physicians (dentists), hospitals, laboratories and the like. But the origins of the costs are essentially those very precise, involved and expert procedures which make modern medicine so widely desirable and effective. The problem of how to reduce the one and retain the other, how to make medical care widely available without losing its effective qualities is the core of the current problem in medicine."

The subjects which follow logically are: medicine and the changing order in recent decades, the health of the nation, medical care in urban areas, medical care in rural areas; extension of the public health services, the quality of medical care, preventive medicine, the hospital, nursing, medical insurance —Voluntary and Compulsory and the method and the goal.

One of the most interesting conclusions drawn is the apparent paradoxical fact that the problem of inadequate health care stems from the very progress of the science and practice of medicine. It is through the higher standards established by medicine itself that comparative health services are drawn and thus inadequacies appear.

After reading the report, the reader understands fully the fallacy of the belief that if all people had enough money, they would or could obtain adequate health service. It is clearly demonstrated that the problem embodies the need primarily for increased personnel, both professional and non professional, and the facilities with which and through which the personnel can function. The book states: "Institutional facilities and hence the number of doctors can be safely expanded only as rapidly as is consistent with good standards." The need for greater concentration on disease prevention also is stressed.

The other important factor in the overall health problem, as reported, is the need for public education in relation to health.

The report acknowledges the inadequacies of health services; offers many concrete and detailed recommendations for meeting the problem, and concludes with: "Better care for the people is a task that will require many years for its achievement; that it can be accomplished only step by step and in a cumulative and accelerating fashion. . . . With the evidence of inadequate and unequal medical care so definitely established, it is a natural reaction on the part of the public to demand an immediate corrective. It is also in the

American manner to attempt to do this by legislation. . . . Those who believe it can be accomplished quickly and chiefly through legislative enactments are, in the Committee's conviction, grossly in error and their proposals place in jeopardy the very aims they have in mind."—*Leo J. Schoeny.*

The Creative Nursery Center. By Winifred Y. Allen and Doris Campbell. 171 pages. Price $2.75. New York: Henry H. Bonnell Fund Family Service Association.

The authors describe, in this short historical sketch, the growth and development of day time care and nursery care for children with emphasis on the problems of such care arising from the complex family life and the needs of the modern family. That many difficulties have been overcome by various professional groups interested in child welfare and in the protection of family life through their efforts to assure adequate standards in the day care and nursery schools is shown.

This book describes not only the experiences of the authors, but deals with trends in programs of day time care and education; the understanding of the children and family; the contribution of the nursery center to the child and the family; application and admission; development through group experience; continuing relationships with parents; leaving the nursery center; the nursery staff works as a team and responsibility for operation and financial support of such projects. It is well written and has a good bibliography.—*Harry Strusser.*

Oral and Dental Diseases. By Hubert H. Stones, M.D., M.D.S. 896 pages with 926 illustrations (many in color). Index. Price $18. Baltimore: The Williams and Wilkins Company, 1948.

Dr. Stones, a professor of dental surgery and director of dental education at the University of Liverpool, director of the Liverpool Dental Hospital, and consultant, E.M.S. Maxillo-facial Centre at the Broad Green Hospital, Liverpool, has divided this new publication into 42 chapters which cover the diseases of the teeth, their investing tissues, the jaws and oral mucosa. Particular attention is paid to etiology and histopathology. Clinical features are fully described.

Instructions for treatment add to the value of this book for students and practitioners. The reviewer believes, in some instances, the instructions for treatment and operative procedures should have been more completely covered in the text. The author, however, no doubt purposely intended that the reader obtain more specific instruction from the reference material.

Illustrations are used freely throughout the text. They include photomicrographs, clinical photographs and drawings. Several of the photographs and photomicrographs are in color.

A comprehensive bibliography of related, recent literature is appended at the end of each chapter. A useful index of authors and subject material appears at the end of the text.

Dr. Stones has made a splendid contribution to the field of oral pathology by making available an up-to-date bibliography of the literature, and this reviewer believes his book deserves a place in the library of every practitioner who specializes in the diagnosis and treatment of oral disease.—*Larry E. Hill.*

Survey of Food and Nutrition Research in the United States 1947. By the Committee on Survey of Food and Nutrition Research of the Food and Nutrition Board. 306 pages. Index. Price $1. Washington, D. C.: National Research Council, 1948.

This is a comprehensive compilation of the organization and the names and addresses of individuals now engaged in current food and nutrition research. Projects are listed and arranged in appropriate subject groupings with notations as to organizations furnishing financial support. Industrial groups as well as public institutions including those of governmental and university type are listed. The index is invaluable.

There are some omissions, possibly because some organizations have not answered requests for information. With cooperation of all scientists this report will be of real value in keeping informed on what is under way in other laboratories. Such knowledge will make it possible to avoid unnecessary duplication and will give information as to the relative emphasis placed on different areas of research. This survey is recommended to all workers in food and nutrition problems, including those dealing with dental implications.—*Dorothea Radusch.*

A Manual of Removable Partial Denture Design. By R. J. Godfrey, D.D.S., M.S. 99 pages with illustrations. Price $3.50. Toronto, Canada: The University of Toronto Press, 1948.

This book is well planned, and is primarily a laboratory manual intended for student use. It includes classification of the types of tooth-borne and mucosa-borne removable partial dentures with diagrams of design methods.

The illustrations are beautifully done but there is no explanation of the reasons for using certain designs. This information, no doubt, is given to the students in the class room, but if it had been included in the book it would have been valuable to the general practitioner. Without it, the illustrations lose much of their value.

It is to be hoped that the author will eventually supply the lacking details. When this is done the book should be a valuable adjunct to any dentist's or student's library. —*Stanley D. Tylman.*

Hemostatic Agents. By Walter H. Seegers, M.S., Ph.D., and Elwood A. Sharp, M.D., Sc.D. 131 pages with 36 illustrations. Index. Price $4.50. Springfield, Ill.: Charles C. Thomas, 1948.

The authors of this book merely mention vessel contraction in oral surgery and concentrate on the normal blood clot. In 91 pages the current concepts of clot formation and information on clinical application gained through research and experience are presented. The bibliography, important in itself, contains 370 references, most of them to current literature.

Chapter one contains a chart designed to show diagrammatically the various changes which take place as the blood clots, and an explanation of the component parts of the diagram is given.

Chapters two and three deal with the mechanics of topical hemostasis with thrombin, a material which seems applicable to dentistry. Several illustrations showing correct and incorrect uses of thrombin are of particular interest since it is stated that the material must be of sufficient concentration and must be carried into contact with the bleeding capillaries. This is necessary so that a clot may form quickly in the cut vessels.

Fibrinogin and its clinical uses are described in chapter four and a description of the use of this material as a "cementing substance" in skin grafting and the fixation of cut nerve ends is of special interest. The newer substances such as fibrin foam, gelatin sponge and oxidized cellulose which may be imbedded and absorbed in tissue are discussed.—*Warren R. Schram.*

Bacterial and Mycotic Infections of Man. By R. J. Dubos. 785 pages with 101 illustrations, including 3 color plates. Index. Price $5. Philadelphia: J. B. Lippincott, 1948.

This volume, like textbooks of medical bacteriology, begins with a short historic section, followed by a discussion of bacterial morphology and physiology and a section on the mechanisms of infection and resistance. This introductory portion covers roughly a quarter of the book.

The next 400 pages are devoted to pathogenic bacteria groups. A comprehensive and up-to-date review of the streptococci, containing discussions of non-hemolytic as well as the hemolytic varieties and an extensive tabulation of their physiologic characteristics, is presented with an outline of the technics for differentiation of the serologically characteristic streptococci. Another chapter of interest to dentists is the one on actinomyces and nocardia. The section on molds and medically important yeasts is well illustrated and there are several pages on the thrush yeast.

The "Bacteriology of Mucous Membranes," presented in some detail, ends with some interesting paragraphs on predisposition and natural resistance. Except for brief mention of the fusospirochetal infections in the chapter just mentioned and a paragraph or two about Borrelia vincenti in the chapter on the spirochetes, there is no discussion of ulceromembranous gingivitis.

The reviewer commends for careful reading by anyone who plans to send material to the laboratory for diagnosis the final chapter, entitled "Cultivation and Identification of Pathogenic Bacteria." It contains much sound advice not to be found elsewhere.

This book is well indexed. If concentrated, it might be useful as a textbook, but with its companion volume on infections caused by viruses and rickettsiae, it could hardly be read by the student during a one-quarter course. —*Evelyn B. Tilden.*

Surgical Pathology of the Mouth. By E. Wilfred Fish, C.B.E., M.D., L.D.S. Cloth. 463 pages with 236 black and white illustrations and 10 color plates. Index. Price $10. London: Sir Isaac Pitman & Sons, Ltd., 1948.

The best portions of this book deal with the dead tracts in dentin, as determined by dye infusion, and with the types of cell infiltrations in inflammation and their significance. The introduction is highly commended to teachers in dental schools and to clinicians deeply concerned with diseased oral structures, because of the attention given there to the biologic status of dental tissues, which, as the author emphasizes, have had too little attention from histologists and biochemists. The chapter on the growth of cells and their subsequent degeneration seems quite as worth-while to the reviewer.

In all there are 18 chapters, six devoted to introductory discussions covering, in addition, such general subjects as circulatory disturbances, inflammation and chemotherapy; a second group of eight dealing with the special pathology of the individual tissues, and finally four chapters covering tumors and related subjects.

This book is not likely to attract many readers in America because the point of view is narrowly British. Of the more than 70 formal references to the literature, mostly in the form of footnotes, less than 10 come from American sources. The material on pyorrhea and gingivitis does not contain a single citation from either American or Continental journals or books. The more recent of the only two references to American work on dental caries is ascribed to Bunting and dated 1936, the second is another of Bunting's, dated 1933.

The discussion of the fatty changes in dental tissues is unsatisfactory since the changes in pulps disclosed by an accepted technic are entirely different from the situation found in the illustration on page 86; the areas designated in this cut as fat are unquestionably something else.

The four chapters on tumors will offer hazards to American readers because the author's classification and terminology do not conform in many respects to American practice. However, clinicians will find the content well worth whatever extra effort may be required to master the uncertainties of names and classification.

The excellent illustrations add much to the text and legends generally have been worked out painstakingly and intelligently for the convenience of the reader. A useful index is included and each chapter is closed with a helpful summary.—*Edward H. Hatton.*

1948 Year Book of Dentistry. Edited by Lester Cahn, Donald A. Keys, Carl W. Waldron, George R. Moore and Stanley D. Tylman. 643 pages with 447 illustrations. Index. Price $5. Chicago: Year Book Publishers.

Five main branches of dentistry are covered in this volume of abstracts culled from leading professional journals throughout the world. There are sections on oral medicine and pathology, oral surgery, operative dentistry, prosthetics, and orthodontics, each division edited by an educator and recognized expert practicing in the special field.

The Journal of Dental Research, Journal of Oral Surgery, Journal of Periodontology, and other such specialty magazines furnish much source material in the sections devoted to their particular branches. There are articles of unusual interest or importance reprinted from representative literature in English ranging from THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION and various state publications to Canadian, British and Australian periodicals. Some foreign extracts are included.

Main sections are divided into several classifications. In the section on oral surgery, for example, material is grouped under extractions, anesthesia and analgesia, infections and chemotherapy, tumors and cysts, temporomandibular joint, fractures and miscellaneous. Caries, restorative work, pedodontia, root canal treatment and general operative work are covered in the operative dentistry section. Other sections are similarly classified. Of particular value to the practitioner interested in children's dentistry is the outline of a program on dental care, listing optimal and minimal requirements, prepared by Norman F. Gerrie, U. S. Public Health Service, and reprinted from the *American Journal of Public Health.*

Illustrations, though necessarily reduced in size, compare favorably with the originals. There is an extensive index. A résumé in brief of the profession's literature of the year, this book affords an extensive, though condensed, record of current dental research and technics. —*Martha Ann Mann.*

Textbook of Histology. By Alexander A. Maximow and William Bloom. Fifth edition. 700 pages with 562 illustrations. Price $8.50. Philadelphia: W. B. Saunders Company, 1948.

The most striking change in the printing of this edition has been the use of the two column page. There appears to be a condensation of subject matter which includes revisions of parts, rewording of other parts, with a few eliminations of material previously used. In the introduction, the section on protoplasm has been rewritten.

The chapter on bone has a more detailed description of bone cells and endosteum. The section formerly listed as cancellous and compact bone is discussed in relation to the architecture of bone. Alterations in the chapter on muscle include a shortening of the discussion of voluntary striated muscle and an elaboration of the section on the mechanism of muscular contraction in cardiac muscle. In the chapter on nerve tissue, an introduction to the nervous system has been rewritten with a new section on the neuron doctrine introduced before the discussion of the description of the cell. The section on neurofibrils, Nissl's bodies, the function of the dendrites, the myelin sheath and the development of the neurons and nervous tissues are revised. Material formerly discussed under several headings now is consolidated under only two subheadings, namely, "Autonomic Nervous System" and the "Synapse and the Interrelationship of the Neurons." The section on arteriovenous anastomoses has been revised while research data on the thymocytes and the thymus have been added.

Additions in the chapter on the respiratory system are found in the subdivisions on the respiratory structures of the lung and on cells lining the alveoli. In the chapter on the female reproductive system the discussion of the sections on endometrium and of the endometrium in early pregnancy has been rewritten.

A few illustrations have been eliminated but many new illustrations have been added, including some in color.

The book is well organized and its content is concise. The chapter on blood forming and blood destroying tissues is especially excellent. This book has always been considered an outstanding contribution, and its use as a teaching medium confirms it.—*J. R. Schumaker.*

Taber's Cyclopedic Medical Dictionary. By Clarence Wilbur Taber and associates. Fifth edition. 1500 pages with 273 illustrations. Price $3.75, indexed $4.00. Philadelphia: F. A. Davis Company, 1948.

Since the author's name does not appear in any of the current biographic dictionaries it is impossible to judge as to his abilities as editor of and contributor to this book. Neither an academic nor a medical degree is given after his name. His associates are from various hospitals in Chicago. In 1932, under the pseudonym of "Modern Job," he wrote "Creative Science: Scientific Basis for a New Religious Philosophy."

This dictionary is in its fifth edition and the preface states that "it is not a mere revision, every line has been rewritten and reset." However, in the 1940 edition reviewed in the *Journal of the American Medical Association* 115:2205, Dec. 21, 1940, the two sentences quoted from the "Treatment of Diabetes Mellitus" are identical with those in the present edition. The 1940 edition is listed here as having 1,488 pages with 273 illustrations. The preface to the 1948 edition states that this edition has "almost 1,500 pages" and on the title page 273 illustrations are noted. Since the dictionary is paged by section, there is no indication of the complete pagination except the remark quoted above.

According to the preface this dictionary "is authoritative and up-to-date in every respect," yet, under "antibiotic," a subject of much current interest, the only information given is the definition "tending to destroy life," while other medical dictionaries define antibiotics and include an explanatory paragraph. The definition of the word antibody is no better. Under "Infection, Focal" is the following paragraph: "One occurring in a focus or cavity and acting as a focus for dissemination of infectious material to other parts of the body. Ex. Apical tooth abscess causing infection of heart and joints." The use of the term "infectious material" is inaccurate and the example given is a statement for which there is no adequate proof. In consideration of these and other deficiencies, such as the use of inferior paper and indistinct illustrations, the usefulness of this book is doubtful. It is not recommended.—*Hilda M. Rankin.*

CURRENT LITERATURE

A Simplified Plan for Obtaining Orthodontic Photographs. Milton Neger. Am. J. Orthodont. 34: 1006, December 1948.

Photographs for orthodontic purposes should be made uniform and to scale. This can be done simply and quickly by placing dots with an indelible pencil on the patient or object to be photographed. The exact distance between the dots is measured with dividers and recorded. Any type of camera may be used if the lens is of long focal length.

An enlarger is used to print each picture to the scale desired. The amount of enlargement necessary is determined by the recorded distance between the dots. This plan can be applied to all phases of orthodontic photography in which exact photographs are required.

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Abstracts of all articles follow the listing of titles.

The Stability of Aqueous Solutions of Sodium Fluoride. William B. Savchuck and Wallace D. Armstrong, University of Minnesota.—4.

Infectivity of Fuso-Spirochetal Exudates for Guinea Pigs, Hamsters, Mice and Chick Embryos by Several Routes of Inoculation. Harry Shpuntoff and Theodor Rosebury, College of Physicians and Surgeons and Columbia University. —7.

The Action of Fluorine Upon the Calcification of the Dentin in Rats With Low Calcium Rickets. J. T. Irving, University of Cape Town, Union of South Africa.—17.

The in Vitro Production of a "Yellow-Brown Melanin-Like Pigment" in the Organic Matrix of Noncarious Human Tooth Crowns by Methylglyoxal (Pyruvic Aldehyde) and Acetol (Acetyl Carbinol). Samuel Dreizen, Henry I. Greene, Bess C. Carson and Tom D. Spies, Northwestern University.—26.

Replica Studies of Changes in Tooth Surfaces With Age. David B. Scott, Harry Kaplan and Ralph W. G. Wyckoff, National Institute of Health, Bethesda, Md.—31.

The Effect of Hypophysectomy Upon the Permanent Dentition of Rhesus Monkeys. Daniel E. Ziskin, Edmund Applebaum and Robert J. Gorlin, Columbia University.—48.

Alkaline Phosphatase in Pulpal Tissue of Human Teeth. Robert J. Bruckner, Western Reserve University.—55.

Calcification of Teeth. II. Comparison of Some Properties of Human and Rat Teeth. Albert E. Sobel, Albert Hanok, Howard A. Kirshner and I. Fankuchen, The Jewish Hospital of Brooklyn and The Polytechnic Institute of Brooklyn. —61.

Phosphatase in Saliva. J. T. Dentay and J. J. Rae, University of Toronto.—68.

The Hydrogen Ion Concentration of the Saliva. I. Factors Influencing CO_2 Content. D. J. Anderson, Guy's Hospital Medical School, London. —72.

Observations on Experimental Dental Caries. II. The Effect of Two Similar Diets Having the Same Initial pH and the Same Growth-Promoting Action. Humberto Granados, Johs. Glavind and Henrik Dam, Polytechnic Institute, Copenhagen, Denmark.—77.

Determination of Oxygen Consumption in Normal and Inflamed Human Gingiva Using the Warburg Manometric Technic. Irving Glickman, Samuel Turesky and Rachel Hill, Tufts College Dental School.—83.

The Stability of Aqueous Solutions of Sodium Fluoride. William B. Savchuck and Wallace D. Armstrong.

This investigation determined the action of light, atmospheric agencies and common types of glass containers on a 2 per cent sodium fluoride solution over a six month period. Storage was in soft or "lime" glass prescription bottles with plastic caps and stoppered borosilicate glass ("Pyrex") flasks. Containers were kept in the dark or on the laboratory shelf, and some of them were unstoppered and shaken up weekly.

Storage in "Pyrex" was apparently without effect on either the solution or the vessel. By contrast, alkalinity of solutions increased and dulling of the inner walls of containers resulted from use of "lime" glass prescription ware. In addition, sedimentation occurred in solutions stored in "lime" glass and exposed frequently to the atmosphere. Analysis

showed no difference in stability of the solutions stored in the dark and on the laboratory shelf.

Infectivity of Fuso-Spirochetal Exudates for Guinea Pigs, Hamsters, Mice and Chick Embryos by Several Routes of Inoculation. Harry Shpuntoff and Theodor Rosebury.

Fusospirochetal exudates were derived from a patient with chronic suppurative periodontoclasia, passed through guinea pigs at least fourteen times and stored when necessary by freezing in solid carbon dioxide. Such frozen exudates, when thawed rapidly after storage for as long as 13 months, contained typical microorganisms with apparently unimpaired motility and yielded characteristic infection with dosages similar to those required with fresh exudates.

The following hosts were found susceptible to infection by the routes noted: guinea pig, subcutaneous or intraperitoneal; hamster, subcutaneous; mouse, intraperitoneal or intracerebral. Infectivity as determined by successive dilution was uniformly low, and there was considerable variation in individual response. No marked differences in infectivity were correlated with species or route of inoculation among the adult hosts.

Differences in pattern of response among the hosts and routes employed tend to favor subcutaneous inoculation in the guinea pig both for passage and for titration of infectivity. The intracerebral route in mice, and all routes of inoculation tested in chick embryos, seemed less suitable than other methods, apparently because of excessive sensitivity to infection with microorganisms other than spirochetes. Mice that survived intracerebral inoculation seemed as susceptible as previously uninoculated mice to subsequent intraperitoneal infection.

The Action of Fluorine Upon the Calcification of the Dentin in Rats With Low Calcium Rickets. J. T. Irving.

This paper deals with the effects of one injection of sodium fluoride solution on the calcification of dentin in low calcium-high phosphorus rickets. Two groups of rats were studied; in one spontaneous calcification of dentin occurred and in the other calcification of dentin was accelerated by the administration of vitamin D.

It was found that the response of dentin in low calcium-high phosphorus rickets was different from the well established pattern of the dentin response to fluorine administration (calciotraumatic band) seen in normal animals and those with high calcium rickets. This response in the present experiment was as follows: when the predentin affected by the fluorine calcified, the calcification on the enamel side of the experimental dentin line occurred up to this line and blended with it. On the pulpal side of this line a layer of uncalcified predentin was seen, and the subsequently formed predentin calcified normally.

The in Vitro Production of a "Yellow-Brown Melanin-like Pigment" in the Organic Matrix of Noncarious Human Tooth Crowns by Methylglyoxal (Pyruvic Aldehyde) and Acetol (Acetyl Carbinol). Samuel Dreizen, Henry I. Greene, Bess C. Carson and Tom D. Spies.

In an attempt to determine the origin of the yellow-brown pigment characteristic of the carious lesion, decalcified noncarious tooth crowns and parts of crowns were exposed to the action of methylglyoxal and acetol for 72 hours at 37 C. A pigmentation varying from yellow to brown was produced which followed the organic pathways of the tooth and which resembled the pigment found in carious teeth in color, insolubility in saliva, apparent formation *in situ* and chemical composition.

The pigment formed by the interaction of the organic elements of the enamel and dentin with two of the carbonyl-containing products of carbohydrate degradation appears to be identical with that found in the naturally occurring carious lesions. These findings lend support to the acid decalcification theory of the mechanism of dental caries.

Replica Studies of Changes in Tooth Surfaces With Age. David B. Scott, Harry Kaplan and Ralph W. G. Wyckoff.

The changes in tooth surfaces which occur with advancing age have been studied by optical microscopy of metal-shadowed collodion replicas. Replicas (1,239) were classified according to the age of the persons (287) from whom the teeth (639) were extracted.

The standard of comparison for visible details was the unerupted or recently erupted tooth surface. The surfaces of young teeth are

completely covered with pronounced patterns of enamel rod-ends and perikymata, and show cracks and stratification. With advancing age rod-ends and perikymata gradually disappear, at rates dependent on the location of the surface on the tooth and of the tooth in the mouth. The number and appearance of the cracks remain constant; stratification disappears rapidly. Photomicrographs and tabular data illustrate these changes.

Consideration is given also to the apparent persistence of enamel cuticle in some areas for long periods of time, and to the structural similarity between surfaces of noncarious teeth, noncarious surfaces of carious teeth and the intact portions of carious surfaces.

The Effect of Hypophysectomy Upon the Permanent Dentition of Rhesus Monkeys. Daniel E. Ziskin, Edmund Applebaum and Robert J. Gorlin.

Hypophysectomy was attempted on six rhesus monkeys in order to study the effect on the permanent dentition. The hypophysis was removed completely in 2 instances and incompletely in 3, and could not be reached in the remaining animal.

The following conclusions were drawn: 1. The normal rate of dentin apposition in the rhesus monkey is about 4 μ per day. 2. The rate of growth differs in the various parts of a tooth. 3. The calcification rhythm is about 16 μ per day. 4. Hypophysectomy causes severe retardation in the rate of dentin apposition and affects the gradient and the calcification rhythm. 5. The calcification of the enamel and dentin is of normal density, unlike that produced by thyroidectomy.

Alkaline Phosphatase in Pulpal Tissue of Human Teeth. Robert J. Bruckner.

This investigation is concerned with the histochemical localization of alkaline phosphatase in sections of decalcified and undecalcified teeth obtained from a human term fetus. Transverse sections cut at the cervical end of the developing crown of a deciduous cuspid were subjected to a modified Gomori technic (1943) for the demonstration of the enzyme in undecalcified material. By employing a slightly modified Lorch method (1946), other teeth were decalcified for periods of 9, 12, 16 and 23 days, and the enzyme was reactivated prior to its demonstration by the Gomori method. Decalcification was carried out in a mixture of acetic acid and sodium acetate, each 0.2 N, which was adjusted to a pH of 4.5 and to which 0.004 Gm. of zinc sulfate were added for each 500 cc. of solution. The enzyme was reactivated by incubating the decalcified specimens for two to four hours at 37 C. in a mixture of two volumes of 0.075 per cent glycine and one volume of 1.0 per cent sodium barbital.

In regions where dentinogenesis is in progress or is imminent, the sites of greatest localization are in the odontoblastic and subodontoblastic regions as well as in the odontoblasts themselves. The intensity of the phosphatase reaction is inversely related to the duration of decalcification. The process of decalcification and reactivation alters the precise localization of the enzyme.

Calcification of Teeth. II. Comparison of Some Properties of Human and Rat Teeth. Albert E. Sobel, Albert Hanok, Howard A. Kirshner and I. Fankuchen.

Dentin and enamel of rat and human teeth were equilibrated with sodium fluoride at a pH of 7.1. In spite of the wide differences in composition that were encountered, both dentin and enamel of the two species gave apatite patterns before and after treatment with the fluoride solutions.

On ignition at 900 degrees, specimens whose $Ca:PO_4$ ratios were less than 1.50 (rat dentin and enamel) gave beta-tricalcium phosphate patterns. Specimens whose $Ca:PO_4$ ratios were greater than 1.60 (human dentin and enamel, and both human and rat dentin and enamel after sodium fluoride treatment) gave apatite patterns. The increase found in the $Ca:PO_4$ ratios of dentins and enamels after sodium fluoride treatment at pH 7.1 was due to preferential solubility of phosphate instead of carbonate. Equations are given to explain why the rat enamel and dentin no longer gave beta-tricalcium phosphate on ignition after sodium fluoride treatment.

Phosphatase in Saliva. J. T. Dentay and J. J. Rae.

Phosphatatic activity was determined by the hydrolyzing action of saliva on disodium phenyl phosphate. The extent of hydrolysis was determined by measuring colorimetrically the amount of phenol liberated and, as a

check, the amount of phosphate liberated. Boiled samples of saliva were used as controls. Corresponding experiments with pork kidney extract showed that phosphatatic activity was not lost as a result of filtration or overlong exposure to air.

The supernatant clear liquid from centrifuged saliva liberated only very small amounts of free phenol, and saliva filtered through a Seitz filter showed no phosphatatic activity whatsoever. The residue obtained on centrifuging whole saliva showed the same phosphatatic activity as whole saliva under the same conditions.

Since saliva after filtering contains no phosphatase and since other animal phosphatases are not removed by such filtering, it is assumed that cell-free saliva contains no phosphatase. The phosphatase in saliva seems to come chiefly from cellular debris and to a lesser extent from microorganisms in the mouth such as Lactobacillus acidophilus.

The Hydrogen Ion Concentration of the Saliva. I. Factors Influencing CO_2 Content. D. J. Anderson.

Experiments were conducted to determine the rate of carbon dioxide loss from human saliva during varying times of exposure to air. It was found that stimulated saliva had a higher initial carbon dioxide content than unstimulated saliva, and that carbon dioxide loss from the former was not statistically significant even after six minutes' exposure. Carbon dioxide loss from unstimulated saliva after one minute's exposure was statistically significant.

Sulfanilamide in concentrations sufficient to inhibit carbonic anhydrase in whole blood failed to influence the rates of carbon dioxide loss.

Observations on Experimental Dental Caries. II. The Effect of Two Similar Diets Having the Same Initial pH and the Same Growth-Promoting Action. Humberto Granados, Johs. Glavind and Henrik Dam.

Thirty Syrian hamsters, 23 days old, were litter-mate distributed into 2 groups and reared for 100 days on two similar diets having the same initial pH and the same growth-promoting action. The two rations had in common that 70 per cent of their content consisted of identical ingredients, mostly carbohydrates. The remaining 30 per cent of the diet given to group 1 consisted of 16 per cent casein, 8 per cent yeast, 3 per cent salt mixture, 3 per cent lard, 0.010 per cent vitamin E and 0.001 per cent vitamin K. The remaining 30 per cent of the diet given to group 2 comprised 19 per cent powdered whole milk, 5 per cent yeast, 5 per cent alfalfa meal and 1 per cent sodium chloride. The diets, as well as water, were supplied ad libitum, and the animals were weighed every week. These experiments were carried out between November and February.

Both groups exhibited the same healthy appearance and the same growth rate in spite of the fact that the ration given to group 1 had a total protein content of 23.60 and that given to group 2, one of 12.52. This indicates the possibility that the powdered milk or the alfalfa, or both, of the ration given to group 2 contained a factor or factors which compensated the lower growth rate to be expected from the lower protein content of this ration.

The incidence and extent of caries was significantly lower in group 1 than in group 2. However, group 1 exhibited much higher incidence of gingival atrophy and alveolar resorption than group 2. Some of the factors which may account for these differences are discussed.

Determination of Oxygen Consumption in Normal and Inflamed Human Gingiva Using the Warburg Manometric Technic. Irving Glickman, Samuel Turesky and Rachel Hill.

A series of experiments was conducted to determine (1) the applicability of the Warburg manometric technic to the determination of oxygen consumption in human gingiva and (2) whether the clinical and microscopic changes in various phases of gingival inflammation were accompanied by correlated alterations in oxygen consumption. The findings indicate that the oxygen consumption of human gingiva is measurable by this technic. In 86 specimens from 46 patients in whom the microscopic gingival picture varied from normal to one of marked chronic inflammation and proliferation, the QO_2 varied from 0.2 to 4.4. There is an apparent relation between oxygen consumption and microscopic pathologic changes.

CASES AND COMMENTS

Multiple Impactions: A Case Report. By M. G. Wheatcroft, D.D.S., Bethesda, Md.

A first class seaman, 19 years of age, presented himself at the U. S. Naval Submarine Base, Pearl Harbor, T.H., in June 1947, for routine dental examination and treatment.

Clinical examination of the oral cavity revealed no abnormalities. The dental arches were of normal size, and all teeth except the lower right molars were present. On questioning as to the loss of these teeth, the patient stated that they had never come through, and roentgen study never had been done.

Roentgen examination showed the mandibular right first, second and third molars impacted, with no apparent accompanying abnormality (Fig. 1).

The patient was admitted to the sickbay for the removal of the impacted teeth. Laboratory studies of the blood which included determination of clotting time, gave normal results. Thirty minutes prior to the operation, 1½ grains pentobarbital sodium was administered. With the patient under conduction anesthesia with procaine hydrochloride, a flap was elevated to expose the alveolar process and mandible. The buccal surface of the second molar was exposed, since the tooth was lying in linguobuccal position. Occlusal bone was removed from the third molar, and this tooth was removed first. The second molar was then removed without difficulty. The crown of the first molar was separated from the root portion with surgical burs and the two parts removed.

Fig. 1.—Roentgenogram showing impaction of mandibular right first, second and third molars

Fig. 2.—Roentgenogram showing result of operation

Difficulty was encountered in removing the coronal portion, owing to its inaccessibility, the difficulty in seeing it and hemorrhage from the inferior dental canal and surrounding bone. The possibility of mechanical fracture of the mandible was always present.

Postoperative roentgenograms were taken at this time. They showed no tooth spicules (Fig. 2). Sharp edges of the bony socket were rounded; the socket was packed with

Commander, Dental Corps, U.S. Navy, now stationed at the Naval Medical Research Institute, Bethesda, Md.

The opinions or assertions contained herein are the private ones of the writer and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

approximately 100,000 units penicillin, and the flap was sutured into position with silk.

Codeine sulfate ½ grain with acetylsalicylic acid 10 grains was given for sedation. An ice cap was applied to the right side of the face for six hours. Sutures were removed after forty-eight hours, and the patient was discharged to duty status with instructions to return to the clinic daily for postoperative examinations. No postoperative complications developed, and healing progressed normally.

The impacted teeth were removed for the following reasons:

1. Trauma to the mandible probably would have resulted in a fracture through the first molar area.

2. The second molar was lying in such a position that eruption would have been possible, and avenues of infection might have been opened.

3. A mandibular partial denture was considered desirable.

Prosthetic Treatment of Extreme Malocclusion: Report of a Case. By L. E. Trinkle, D.D.S., Terre Haute, Ind.

The object in presenting this case is to show a method of correcting extreme malocclusion of the type illustrated, and the progress made in prosthetic dentistry over a period of 30 years.

The patient came to me for some fillings 30 years ago, when he was 20 years old. I thought something could be done to remedy his malocclusion with removable restorations. Models were made and wax patterns of teeth to extend the vertical dimension were prepared, but the upper natural teeth were so short I saw no way for retention. I took the patient to Indianapolis for consultation with a very progressive dentist. His decision was that nothing could be done to improve the condition, so I dismissed the patient.

About five years ago, in discarding unwanted accumulation in my laboratory, I found the patterns made so long ago for this patient. Thinking I would never see him again, I threw them away. In January 1946 he walked into my office.

The only tooth that stopped the bite was the lower left second molar, which slightly occluded with the upper molar. This lower molar was sore and loose, and roentgenograms revealed pyorrhea. The tooth was extracted, which left no contact.

As facilities for casting had improved since the patient's first visit 30 years before, models were made and studied for retention. The upper teeth were very short, but sufficient retention for clasps was found. Bite blocks were made, the upper covering the occlusal surfaces of the natural teeth. Vertical dimension was established, the added amount being divided between the upper and lower teeth.

The wax pattern covered the incisal edges of the lower anterior teeth. These were finished with acrylic the size and shade of the natural teeth. The posterior teeth were of porcelain.

A very thin casting covered the occlusal surfaces of the upper bicuspids and molars, and furnished retention for the acrylic to carry posterior porcelain teeth. Anterior pin teeth of porcelain were set in the ample space anterior to the natural teeth. Figure 1 shows the finished restorations and casts made before and after treatment.

Thus a full set of porcelain teeth was provided for the upper jaw, with the anterior teeth prominent enough to bring the lip forward to establish a normal profile. With the

Fig. 1.—Above: Side view of casts made before and after restorations were made. Below: Front view of casts made before and after restorations; the completed restorations

Fig. 2.—Portraits of the patient without restorations, left. With restorations in place, right

mandible relaxed to a rest position, there was plenty of free-way space and there was also space for a bulk of food. The portraits in Figure 2 show the improvement the restorations made in the patient's appearance.

After the malocclusion was corrected, the patient reported he no longer suffered from constipation as he had in the past. No trouble was experienced by the patient while eating or talking with the dentures in place, and no alteration has been necessary in the year and a half since they were constructed.—*214 Rose Dispensary Building.*

Fracture of the Mandible: Report of a Case. By Charles R. Shea, D.D.S., Bremerton, Wash.

A man, 22 years of age, was admitted to the hospital with a compound fracture at the angle of the mandible.

The left side of the face was extensively swollen and the patient was having trouble opening and closing his mouth. The mucous

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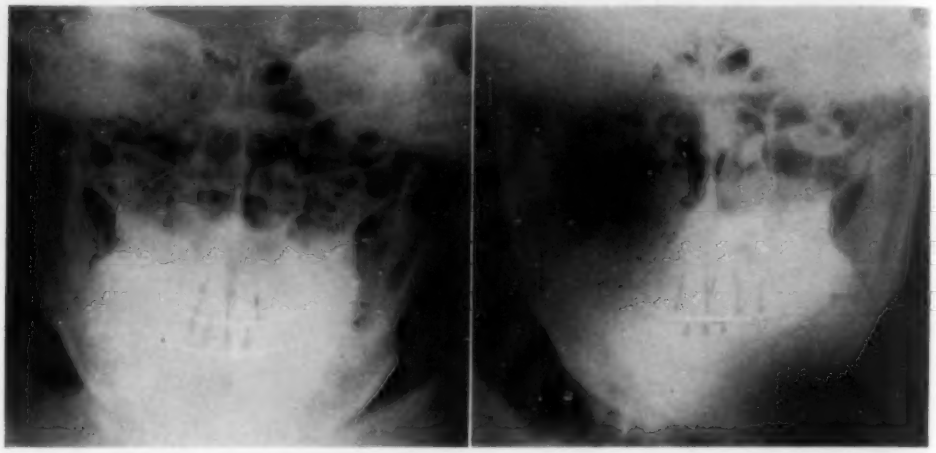

Left: Postoperative roentgenogram showing ramus still turned inward. Right: Roentgenogram showing traction in place and reduction of the fracture

membrane over the left third molar area was perforated and there was luxation of the left mandible.

A posteroanterior roentgenogram revealed a fracture through the angle of the left mandible, with the ramus turned inward.

Under local anesthesia intermaxillary bands were placed and the fragments were manipulated into position. Rubber traction was placed and a postoperative roentgenogram was taken. This revealed the ramus still turned inward in its original position (Illustration, left). The bands were left in place and under local anesthesia, the mandible was forced open on the right side with tongue blades, and a large wide Seldin periosteal elevator was placed on the internal surface of the ramus. Supporting this elevator with cotton rolls, external posterior pressure was applied and the ramus was moved outward.

A postoperative roentgenogram showed the traction in place and good reduction of the fracture at the angle (Illustration, right). Routine prophylaxis was carried out. In four weeks the appliances were removed, and the patient had an uneventful recovery.

▲

Limitation of Earnings.—In assessing the effects of the Limitation of Earnings Regulations, one important point appears to have been overlooked, namely, that to earn more than £4,800 is in fact to be out of pocket. Assuming the dentist earns £100 above the permitted maximum, the Ministry recognizes that of this, £52 is expenses, approximately £3 is deducted for superannuation chargeable to "practice expenses" and £50 confiscated. Thus the extra £100 has cost £105, and if, as is the case of many single-handed men, expenses are greater than 52 per cent the position is even worse.

Is it any wonder that busy practitioners are refusing to carry out casual extractions under the National Health Service.—*Fred Butterfield, Brit. D. J. Supplement, Feb. 18, 1949, p. 24.*

LIST OF DENTAL OFFICERS

SEPARATED FROM ARMY DENTAL CORPS

THE following list of dental officers separated from the Army Dental Corps does not include rank because such information is no longer furnished by the Surgeon General's Office. Publication will be given to other names as soon as possible.

Alabama

Clanton	Harris, Norman T.
Decatur	Michelson, Leonard
Mt. Vernon	Walker, Samuel A.

California

Centerville	Lewis, Edward A.
Huntington Park	Washburn, Newell M.
Los Angeles	Rossie, Gilbert J.
Sacramento	McKee, Alexander V.
San Francisco	Hoffer, Frederick L., Jr.
San Francisco	Lamoreux, Thomas G.
San Francisco	Woo, Edmund E.

Connecticut

Colchester	Neleber, Seymour
Hartford	Padula, Joseph D.
New Britain	Chestner, Stanley B.
New Britain	Dunn, Albert M.
New Haven	Goodman, Marvin M.
West Hartford	Liftig, Alvin B.

District of Columbia

Washington	Shiflet, Claude J., Jr.
Washington	Wyman, Lyle W.

Georgia

Columbus	Taylor, Thomas E., Jr.
Madison	Dickins, Charles H., Jr.
Rossville	Hawkins, Ralph A.

Hawaii

Honolulu	Akimine, Ralph N.

Illinois

Carlyle	Potts, Harry D.
Chicago	Carroll, George W.
Chicago	Dunn, Arthur S.
Chicago	Robinson, Marvin J.
Chicago	Schulz, Brethold F.
Chicago	Waller, Marvin I.
Coulterville	Neill, Clifford G.
Evanston	Williams, Charles H.
Lincolnwood	Pike, Wayne S.
Springfield	Olsan, Keith E.

Indiana

Terre Haute	Anshutz, Wade B., Jr.
West Terre Haute	Sloan, Roy J.

Iowa

Ames	Wishart, Wayne L.
Onawa	Brandt, Max J.
Osceola	Curnes, Ronald W.
Villisca	Phillips, Robert D.
Vinton	Hansen, Raymond T.
Waterloo	Ostheimer, Warren R.
Waterloo	Yeager, Walter G.

Kentucky

Hopkinsville	Mayhall, Harvey R.
Shawnee	Robins, William V.

Louisiana

New Orleans	Cyrus, Gerald G.
New Orleans	Puglia, Joseph F.

Maryland

Baltimore	Oring, Stanley M.
Baltimore	Towlen, Lloyd G.
Bethesda	Rogers, Richard G., Jr.
Chevy Chase	Splain, Robert D.
Cumberland	Butler, Harry F.

Massachusetts

Longmeadow	Corriveau, Joseph C.
Swampscott	Pickering, Donald A.

Michigan

Detroit	Goodman, Daniel
Detroit	Segal, Norman A.
Zeeland	Flasman, Gilbert J.

Minnesota

Duluth	Gehrig, John D.
St. Paul	Quast, John R.
South Moorhead	Rostad, Phillip E.

Mississippi

Waynesboro	Hurt, William C.

Missouri

Appleton City	Wood, Robert E.
Jackson	Lawson, Charles W.
St. Joseph	Quinn, James D.
St. Louis	Putnam, Dickson J.

Montana

Glendive	Fager, Frank

Nebraska

Aurora	Shafer, John E.
Wakefield	Brt, Otto K.

New Jersey

Bloomfield	Wodka, Walter
Bridgeton	Nakauchi, Masaki
Elizabeth	Lebau, Gerald I.
Jersey City	Levinson, Max

Newark	Ackerman, Martin
Roselle	Pita, Frank L.

New Mexico

Albuquerque	Garehime, Donavon H.
Albuquerque	Phelan, Patrick F.

New York

Amityville	Schaefer, Vincent A.
Brooklyn	Cohen, Barnett
Brooklyn	Corwin, Bernard B.
Brooklyn	Kirschenbaum, Irwin
Brooklyn	Kolb, Herbert R.
Brooklyn	Lestner, Gerard
Brooklyn	Mittelman, George J.
Brooklyn	Nachbar, Stephen O.
Brooklyn	Pollock, Herman F.
Brooklyn	Rosenberg, Murray
Brooklyn	Rubin, Joseph D.
Brooklyn	Vickness, Solomon L.
Brooklyn	Wisotsky, Maurice
Brooklyn	Wittcoff, Edward
Bronx	Kerson, Jerome
Bronx	Lustig, Clifford J.
Buffalo	Jenner, Gordon A.
Buffalo	Puchalski, Thaddeus J.
Clarence	Buell, Warren J.
Durhamville	Seibel, Mason E.
Great Neck	Van Camerik, Howard C.
Jamestown	Glair, Gordon F.
Lockport	Crawford, Johnston J.
Mamaroneck	Prakin, Alexander J.
Newburgh	Moses, Harold D.
New York	Brenner, Morton R.
New York	Dolin, Louis L.
New York	Greiger, Morton F.
New York	Jarow, Harold
New York	Orens, Stanley M.
New York	Skraly, Myron B.
Niagara Falls	Kramer, Louis
Niagara Falls	Marra, Joseph V.
Oneonta	Pondolfino, Joseph T.
Oxford	Westover, Warren O.
Poughkeepsie	McKenna, Joseph J.
Rochester	Kushner, Harold
Rochester	Maddy, Donald
Staten Island	Roland, Albert
Waddington	Evans, Edward D.
Westport	Merrihew, Noel H., Jr.

North Carolina

Asheville	Keener, Harold J.
Buies Creek	Marshbanks, Burgess P., Jr.
Murphy	Miller, Charles M.

Ohio

Cleveland	Congleton, Ralph B.
Cleveland	Marks, Bertram S.
East Liverpool	Lavin, Norton E.
Ironton	Slack, Roy G.
New Boston	McClurg, William R.
Toledo	Proshek, George W.
Wakefield	Honaker, Thomas T.
Washington	Morgan, Howard H.

Oklahoma

Lawton	Brock, Eugene W.
Oklahoma City	Shaffer, Ward L.
Shawnee	Landrum, John R.

Pennsylvania

Dormont	Catalano, Edward W.
East Plymouth	Skladany, Joseph E.
Emporium	Lathrop, Laurence L.
Forest Hills	Krause, Arthur R.
Johnstown	Finkelstein, Seymour
Philadelphia	Chester, Abraham
Philadelphia	Donnelly, Francis E., Jr.
Philadelphia	Kessler, Paul
Philadelphia	Maiocco, Pasquale D.
Pittsburgh	Goldblum, Samuel
Pittsburgh	Watson, William P.
Quakertown	Shelly, George J., Jr.
Towanda	Prusack, Nicholas O.
Venetia	Bartram, William J., Jr.
Wyncote	Bower, John Oscar, Jr.

Rhode Island

Cranston	Sepe, Henry W.
Newport	McSparren, Thomas R.
Providence	Oddo, Vincent J., Jr.

Tennessee

Memphis	Kubik, Burdette H.

Texas

Beaumont	Richardson, Jack M.
Brownville	Hofheinz, Paulus A.
Jefferson	Rudisaile, Maxwell B.
Longview	Thomas, Tommy
Plano	Porterfield, James H.

Vermont

Barre	Carlucci, Vincent A.
Burlington	Slack, Howard D.

Virginia

Petersburg	Myers, William H.
Petersburg	Pilcher, Edwin M.

Washington

Seattle	Nelson, Richard L.

West Virginia

Everettville	Radivojevic, Alexander
Huntington	Vest, William J.

Wisconsin

Manawa	Herman, Robert E.
Milwaukee	Blaisdell, Henry W.
Milwaukee	Fabric, Fred
Milwaukee	Gabert, Lawrence W.
Milwaukee	Gloyeck, Alvin R.
Milwaukee	Gumm, Blayne A.
Milwaukee	Ottenstein, Bernard D.
Milwaukee	Parman, Glarner G.
Milwaukee	Post, Albert C., Jr.
Milwaukee	Schroeder, Charles R.
Milwaukee	Stiglitz, Joseph W.
Milwaukee	Wisniewski, Frank A.
Milwaukee	Zubrensky, Louis
Rice Lake	Elbert, John A.
Watertown	Grosnick, Arthur F.

DEATHS

Aiken, David, Winnsboro, S. D.; Baltimore College of Dental Surgery of the University of Maryland, 1890; died March 10; aged 81.

Albright, Harry A., Moline, Ill.; Chicago College of Dental Surgery, 1912; died March 26; aged 61.

Barnard, John E., Oberlin, Ohio; School of Dentistry, University of Pennsylvania, 1901; died February 25; aged 74.

Barnett, Charles L., Seattle; Dental School, Northwestern University, 1906; died March 26; aged 65.

Barnhill, Thomas S., Charleston, S. C.; Atlanta Dental College, 1912; died March 15; aged 60.

Bartlett, George O., Ogden, Utah; School of Dentistry, North Pacific College of Oregon, 1928; died February 5; aged 58.

Bearstler, Oren J., Pottsville, Pa.; Philadelphia Dental College, 1902; died February 4.

Berry, J. J., Deadwood, S. D.; School of Dentistry, Washington University, 1916; died March 31.

Bibby, Howard, La Crosse, Wis.; Dental School, Marquette University, 1918; died April 3; aged 54.

Blakeslee, F. E., Earlville, Ill.; Chicago College of Dental Surgery, 1899; died March 2; aged 71.

Blim, Arthur W., Chicago; Dental School, Northwestern University, 1913; died April 21; aged 58.

Booth, Walter H., Grand Rapids, Mich.; College of Dental Surgery, University of Michigan, 1891; died March 3; aged 80.

Bostwick, Frank B., Woodstown, N. J.; School of Dentistry, University of Pennsylvania, 1906; died March 4; aged 69.

Bowman, B. Hugo, Canton, Ohio; School of Dentistry, Western Reserve University, 1904; died March 31, aged 70.

Boyer, Francis P., Allentown, Pa.; died January 24; aged 28.

Brady, Frank P., Minneapolis; Dental Department, Minnesota College Hospital, 1918; died February 28; aged 63.

Breed, Ernest M., Warren, Pa.; School of Dentistry, University of Pittsburgh, 1918; died March 30.

Broadwater, Melvin F., Frederick, Md.; Baltimore College of Dental Surgery, 1915; died February 11; aged 60.

Browder, Robert M., Crossville, Tenn.; School of Dentistry, Vanderbilt University, 1906; died February 25.

Brown, Foster K., Buffalo; School of Dentistry, University of Buffalo, 1918; died March 13; aged 53.

Buddinger, A. Lee, Jamaica, N. Y.; died February 5; aged 62.

Bushee, Ralph W., Monticello, Ill.; Dental School, Northwestern University, 1911; died March 16.

Capo, John T., New Orleans; School of Dentistry, Tulane University, 1912; died February 4; aged 59.

Carey, Albert B., Pittsfield, Ill.; Dental School, Northwestern University, 1896; died February 18.

Cenci, Vincent, Providence, R. I.; Dental School, Harvard University, 1931; died March 7.

Chambers, Clifford B., Indianapolis; Indiana Dental College, 1919; died February 10; aged 52.

Chambers, W. T., Denver; Pennsylvania College of Dental Surgery, 1886; died March 29; aged 82.

Chase, John M., Dayton, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1891; died March 27; aged 81.

Cleaveland, Harold H., Springfield, Mass.; Pennsylvania College of Dental Surgery, 1899; died February 2; aged 73.

Clemente, Raymond F., Waterbury, Conn.; School of Dentistry, St. Louis University, 1935; died February 19; aged 38.

Cloud, Virgil R., Genesee, Pa.; died January 18.

Coggar, William T., Boston; Tufts College Dental School, 1917; died February 11; aged 53.

Cohen, Arthur, New York; died February 9.

Cole, Bert L., Minneapolis; College of Dentistry, University of Minnesota, 1911; died April 15; aged 61.

Cole, Fennel M., St. Louis; School of Dentistry, St. Louis University, 1905; died March 18; aged 67.

Cole, Frank C., New York City; College of Dental Surgery, University of Michigan, 1911; died March 31; aged 64.

Coleman, C. B., Poplar Bluff, Mo.; Dental Department, Marion-Sims College of Medicine, 1897; died February 1.

Constantine, Clarence A., Atlanta, Ga.; died January 27; aged 73.

Craig, Homer T., San Francisco; College of Dentistry, University of California, 1898; died March 31; aged 72.

Crandall, John W., Mancelona, Mich.; Department of Dental Surgery, Detroit College of Medicine, 1909; died March 17; aged 64.

Cravens, James J., Whiting, Ind.; Indiana Dental College, 1923; died February 5; aged 49.

Cruise, Joseph P., Chicago; Chicago College of Dental Surgery, 1898; died March 2.

Cullen, Edward E., St. Louis; School of Dentistry, St. Louis University, 1923; died February 17; aged 48.

Currie, Marie P., Boston; Tufts College Dental School, 1900; died February 22; aged 78.

Dallager, Roy A., Chicago; Dental School, Northwestern University, 1913; died March 12; aged 59.

Davis, Isaac E., Reading, Pa.; died March 16; aged 53.

Delaney, Henry A., Boston; died February 4; aged 60.

Dempsey, Thomas F., Milwaukee; Dental School, Marquette University, 1919; died March 20; aged 69.

Doepp, Albert G., Chicago; died March 26; aged 77.

Donohoe, Thomas F., Jr., Philadelphia; died April 2; aged 48.

Dow, William M., Detroit; College of Dental Surgery, University of Michigan, 1906; died January 31; aged 69.

Duncan, Harrison B., Freehold, N. J.; School of Dentistry, University of Pennsylvania, 1914; died March 5; aged 60.

Dunn, Harrison M., Elizabeth, N. J.; Baltimore College of Dental Surgery of he University of Maryland, 1900; died March 5; aged 76.

Eaton, Milton P., Philadelphia; School of Dentistry, University of Pennsylvania, 1924; died February 24; aged 48.

Elliott, John G., Manchester, N. Y.; School of Dentistry, University of Buffalo, 1902; died March 16; aged 73.

Epstein, Harry, Elizabeth, N. J.; died April 9; aged 67.

Erwin, Harry A., Seattle; School of Dentistry, Temple University, 1898; died January 26; aged 70.

Farris, George A., Sapulpa, Okla.; Western Dental College, 1909; died February 27; aged 75.

Farver, J. Walter, Cleveland; School of Dentistry, Western Reserve University, 1910; died February 16; aged 73.

Faught, Walter O., Nashville, Tenn.; School of Dentistry, Vanderbilt University, 1925; died March 5; aged 52.

Fetter, Orville J., Cincinnati; Ohio College of Dental Surgery, University of Cincinnati, 1900; died February 26; aged 48.

Fietsch, John F., Forest Park, Ill.; Dental School, Northwestern University, 1909; died February 14.

Fitzgerald, William, Chicago; Dental School, Marquette University, 1924; died April 2; aged 52.

Franchetti, James P., Santa Rosa, Calif.; College of Physicians and Surgeons, 1930; died February 7; aged 45.

Fulkerson, H. C., Norris City, Ill.; died April 1; aged 50.

Furber, C. Floyd, Burton Heights, Mich.; College of Dental Surgery, University of Michigan, 1919; died February 24; aged 66.

Garratt, Van C., Seattle, American College of Dental Surgery, 1892; died February 11; aged 77.

Garvin, Franklin M., Dallas, Texas; College of Dentistry, Baylor University, 1924; died January 29.

Gehle, Ernest C., New York City; New York College of Dentistry, 1919; died April 25; aged 57.

Gibson, Will W., Grand Rapids, Mich.; Dental School, Northwestern University, 1905; died January 22; aged 72.

Gleason, Ovella M., Macon, Ga.; Atlanta-Southern Dental College, 1929; died February 17.

Gober, John W., Arab, Ala.; Atlanta Dental College, 1916; died January 18; aged 57.

Goepper, William E., Louisville, Ky.; Louisville College of Dentistry of Centre College, 1913; died March 24; aged 61.

Golden, Winfred L., Oakland, Calif.; College of Dentistry, University of California, 1919; died April 3; aged 52.

Gordon, Frank L., Pittsburgh; died February 7; aged 47.

Grennan, Frank T., Schenectady, N. Y.; Pennsylvania College of Dental Surgery, 1901; died March 4; aged 77.

Lawyer, G. Gould, Philadelphia; Department of Dentistry, Medico-Chirurgical College of Philadelphia, 1899; died January 30; aged 73.

Swann, J. H., South Pasadena, Calif.; died January 13; aged 80.

Taylor, James H., Flint, Mich.; College of Dental Surgery, University of Michigan, 1906; died February 21.

Taylor, William D., Newark, N. J.; School of Dentistry, University of Pennsylvania, 1909; died January 17; aged 62.

Tetrick, G. L., Manhattan, Kan.; Kansas City Dental College, 1892; died December 1.

Thompson, James A., Whitman, Mass.; died January 28; aged 92.

Tinsman, Frederick H., Rochester, New York; College of Dental Surgery, University of Michigan, 1918; died January 15; aged 55.

Tower, Guy C., Shelburne Falls, Mass.; School of Dentistry, Temple University, 1899; died January 4; aged 75.

Traeger, Frank A., Riverside, Ill.; Dental School, Northwestern University, 1906; died March 8; aged 69.

Underwood, S. R., Chattanooga, Tenn.; died January 3.

Van Cott, Lewellyn, Pomona, Calif.; College of Dentistry, University of Southern California, 1930; died January 29; aged 45.

Villars, Roy T., Little Rock, Ark.; School of Dentistry, Washington University, 1905; died January 30.

Waite, F. S., Cumberland, Wis.; Chicago College of Dental Surgery, 1902; died January 15.

Waldhier, Herbert F., Indianapolis; died January 27; aged 26.

Walker, Lewis F., Aberdeen, Wash.; School of Dentistry, North Pacific College of Oregon, 1905; died December 30; aged 71.

Walker, William C., Chicago; Dental School, Northwestern University, 1904; died January 27.

Wallace, R. H., Hatton, N. D.; Dental School, Northwestern University, 1908; died January 14.

Warner, Jacob W., Hillside, N. J.; School of Dentistry, University of Pennsylvania, 1905; died January 21; aged 73.

Watson, O. D., Kansas City, Mo.; Western Dental College, 1914; died February 6; aged 57.

Weekley, James R., Philippi, W. Va.; School of Dentistry, University of Pittsburgh, 1904; died February 17.

Weiss, Jacob L., Richmond Hill, N. Y.; College of Dental and Oral Surgery of New York, 1918; died March 1; aged 51.

White, Burnley C., Gretna, La.; School of Dentistry, Loyola University, 1925; died January 7; aged 45.

Whitmore, Carl E., Muskegon, Mich.; Department of Dental Surgery, Detroit College of Medicine, 1898; died December 13; aged 80.

Whitson, Oscar L., San Marino, Calif.; Dental School, Northwestern University, 1901; died January 15.

Wiesler, Louis E., Cedarburg, Wis.; Chicago College of Dental Surgery, 1898; died February 6; aged 75.

Wild, R. F., St. Louis; School of Dentistry, Washington University, 1899; died January 11; aged 86.

Williams, William D., New Cumberland, W. Va.; College of Dentistry, Ohio State University, 1918; died February 12; aged 85.

Witt, William, New York City; New York College of Dentistry, 1913; died January 25; aged 67.

Wittenberg, Joseph J., Cincinnati; Ohio College of Dental Surgery, University of Cincinnati, 1924; died January 12; aged 67.

Young, Lawrence B., Wayne, Neb.; College of Dentistry, Creighton University, 1927; died January 21.

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ANNOUNCEMENTS

MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama			G. W. Matthews	1922 Tenth Ave., S., Birmingham 5
Arizona			H. G. DeWolf	Valley National Bank Bldg., Tucson
Arkansas			D. M. Hamm	White Bldg., Clarksville
California			L. R. Ludwigsen	450 Sutter St., San Francisco
S. California			M. E. Ralston	Medico-Dental Bldg., Pomona
Colorado			R. A. Downs	724 Republic Bldg., Denver 2
Connecticut	June 1-3	New London	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			Norbert L. Gladnick	1009 Madison St., Wilmington
D. of Columbia			K. H. Wood	202-1835 Eye St., N. W., Washington
Florida	Nov. 10-12	Palm Beach	L. M. Schulstad	Professional Bldg., Bradenton
Georgia	Nov. 13-15	Savannah	J. M. Heard, Jr.	Persons Bldg., Macon
Hawaii	June 15-18	Honolulu	J. H. Dawe	P. O. Box 39, Honolulu 10
Idaho	June 27-29	Idaho Falls	H. R. Packard	Idaho Falls
Illinois			P. W. Clopper	623 Jefferson Bldg., Peoria 2
Indiana			E. E. Ewbank	Kingman
Iowa			H. I. Wilson	639 Insurance Exchange Des Moines
Kansas			F. A. Richmond	1008 Huron Bldg., Kansas City
Kentucky	Mar. 29-31, 1950	Louisville	A. B. Coxwell	1976 Douglass Blvd., Louisville
Louisiana	June 1-4	New Orleans	J. S. Bernhard	407 Medical Arts Bldg., Shreveport
Maine	June 23-25	Rockland	P. W. Anderson	32 Deering St., Portland 3
Maryland			E. L. Pessagno, Jr.	415 Medical Arts Bldg., Baltimore 1
Massachusetts			P. E. Adams	106 Marlborough St., Boston
Michigan	April 24-26, 1950	Detroit	H. C. Gerber, Jr.	1514 Olds Tower Bldg., Lansing
Minnesota	Feb. 20-23, 1950	St. Paul	C. V. E. Cassel	242 Lowry Medical Arts Bldg., St. Paul
Mississippi			F. C. Sneed	Osyka
Missouri			R. R. Rhoades	201 Merchants Bank Bldg., Jefferson City
Montana			C. S. Renouard	304 Phoenix Bldg., Butte
Nebraska			F. A. Pierson	Federal Securities Bldg., Lincoln
Nevada	June 3-4	Reno	L. G. Jacob	505 Chestnut St., Reno
New Hampshire	June 19-21	North Conway	F. E. Williams	814 Elm St., Manchester
New Jersey			J. G. Carr	407 Copper St., Camden
New Mexico			J. S. Eilar	First National Bank Bldg., Albuquerque
New York			C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina			R. F. Hunt	Rose Drug Co., Bldg., Rocky Mount
North Dakota			A. L. Smeby	Northwood
Ohio	Nov. 13-16	Columbus	E. G. Jones	185 E. State St., Columbus
Oklahoma	April 16-19, 1950	Tulsa	H. Leon Snow	Plaza Court Bldg., Oklahoma City
Oregon			C. Fixott, Jr.	Medical Dental Bldg., Portland
Panama Canal Zone			R. O. Leon	Box 1094, Ancon
Pennsylvania	June 1-3	Pittsburgh	J. Wittek	217 State St., Harrisburg
Puerto Rico			F. Guerra	Avenida Ponce de Leon, Santurce
Rhode Island			J. F. Colgan	838 Newport Ave., Pawtucket
South Carolina			J. R. Owings	201 E. North St., Greenville
South Dakota			E. W. Elmen	Sioux Falls
Tennessee			E. J. Justis	Exchange Bldg., Memphis
Texas			W. Ogle	313 Medical Arts Bldg. Dallas
Utah	June 9-11	Salt Lake City	H. R. Nordberg	807 Tribune-Telegram Bldg., Salt Lake City
Vermont			J. A. Larrow	Middlebury
Virginia			J. E. John	804 Medical Arts Bldg., Roanoke
Washington	June 20-22	Seattle	F. J. Dingler	1502 Medical-Dental Bldg., Seattle 1
West Virginia			C. J. Gavelda	Union Bank Bldg., Clarksburg
Wisconsin			R. A. Mason	964 N. 27th St., Milwaukee 2
Wyoming	June 27-29	Laramie	T. A. Ward	Casper

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama	June 13-18*	Birmingham	M. W. Gaillard	Merchants Bank Bldg., Mobile
Arizona	July 6-9	Florence	R. K. Trueblood	25 N. Second Ave., Glendale
Arkansas	June 20-23	Little Rock	H. E. Hanna	Wilson Building, El Dorado
California	June 13	Los Angeles	K. I. Nesbitt	Room 307, 507 Polk Street,
	July 25	San Francisco		San Francisco 2
Colorado	June 20-24	Denver	E. G. Netherton	724 Republic Bldg., Denver 2
Connecticut	June 14-18*	Hartford	C. G. Brooks	302 State St., New London
Delaware	June 22-24	Wilmington	P. K. Musselman	Newark
D. of Columbia	June 6-10*	Washington, D. C.	Doran S. Thorn	1726 Eye St., N. W., Washington 6
Florida	July 11-16*	Jacksonville	A. W. Kellner	P. O. Box 155, Hollywood
Illinois	June 21-24	Chicago	W. A. McKee	503 Wood Bldg., Benton
Indiana	June 13-16	Indianapolis	C. A. Frech	Gary National Bank Bldg., Gary
Kentucky	June 20-23*	Louisville	R. I. Todd	Western Union Bldg., Richmond
Maine	July 2-3	Augusta	R. A. Derbyshire	Box 387, Skowhegan
Maryland	June 13-15	Baltimore	K. W. Preis	700 Cathedral St., Baltimore 1
Massachusetts	June 20-24‡	Boston	J. C. Wilson	413 N. State House, Boston
Minnesota	June 13-18	Minneapolis	E. E. Comartin	334, 100 First Avenue Bldg., Rochester
Mississippi	June 21-23	Jackson	J. C. Boswell	508 Lamar Life Bldg., Jackson
Nebraska	June 7-8†	Lincoln and	C. A. Bumstead	924 Stuart Bldg.,
	June 9-10	Omaha		Lincoln
New Jersey	June 6-10		W. A. Wilson	150 E. State St., Trenton
New Mexico	June 27-30	Santa Fe	J. J. Clark	Artesia
New York	June 24-25	New York	David W. Beier	23 S. Pearl St.,
	June 28-July 1	Buffalo		Albany 7
	Sept. 30-Oct. 1	New York		
	Oct. 4-7	Buffalo		
North Carolina	June 27-30	Raleigh	F. O. Alford	Charlotte
North Dakota	July 10-14*	Fargo	W. J. Ford	Fargo
Ohio	June 13-15†	Columbus	E. D. Lowry	79 E. State St., Columbus
	June 20-22†	Cleveland		
	June 27-29**	Columbus		
Oklahoma	June 13-15	Oklahoma City	N. D. Griffith	509 Medical Arts Bldg., Oklahoma City
Pennsylvania	June 20-25††	Philadelphia and Pittsburgh	R. E. V. Miller	Northampton, National Bank Bldg., Easton
Rhode Island	June 28-29	Providence	F. M. Hackett	State Office Bldg., Divn.
	Dec. 6-7			Professional Regulation, Providence
South Carolina	July 25	Columbia	E. G. Bumgardner	1517 Hampton St., Columbia 1
South Dakota	June 26-29	Sioux Falls	R. W. Ellis	Salem
Tennessee	June 6-10	Memphis	J. J. Vaughn	1005-6 Medical Arts Bldg., Nashville 3
Texas	June 19-24	Dallas	R. T. Weber	312 Capital National Bank Bldg., Austin
Vermont	June 27-29	Montpelier	F. A. Reid	Windsor
Virginia	June 14	Richmond	J. M. Hughes	715 Medical Arts Bldg., Richmond
West Virginia	June 27-29	West Liberty	R. H. Davis	510-16 Goff Bldg., Clarksburg
Wisconsin	June 13-17	Milwaukee	S. F. Donovan	Tomah

*Dental and dental hygiene examination

†Practical examinations

**Theory examinations

††June 20-25 (dental); June 20-22 (dental hygiene)

‡June 20-24 (dental); June 22-24 (dental hygiene)

OTHER MEETINGS

Name	Date	City	Secy. or Chmn.	Address
Academy of Denture Prosthetics	June 13-18	Indianapolis	I. L. Furnas Secy.	928 Silverado St., La Jolla, Calif.
American Academy of Dental Medicine, Annual Meeting	June 4-5	New York	W. M. Greenhut Secy.	124 E. 84th St., New York 28
American Academy of Oral Pathology, Second Annual Mid-Year Symposium	June 18	Washington, D. C.	J. L. Bernier Secy.	Army Institute of Pathology, 7th & Independence Ave., S. W., Washington 25, D. C.
American Academy of Periodontology, Annual Meeting	Oct. 13-15	San Francisco	C. E. Chamberlain Secy.	115 North St., Peoria
American Association of Dental Examiners	Oct. 15-16	San Francisco	C. A. Bumstead Secy.	924 Stuart Bldg., Lincoln, Neb.
American Association of Dental Schools, Annual Meeting	June 27-29	Chicago	John Buhler Secy.	Emory University School of Dentistry, Atlanta, Ga.
American Dental Assistants Association	Oct. 17-20*	San Francisco	Mary L. Martin	610 Jefferson Ave., La Porte, Ind.
American Dental Association, Ninetieth Annual Meeting	Oct. 17-20	San Francisco	H. Hillenbrand Secy.	222 E. Superior St., Chicago 11
American Dental Hygienists' Association, Twenty-Sixth Annual Meeting	Oct. 17-21	San Francisco	A. Rebekah Fisk Secy.	1830 Eye St., N. W., Washington, D. C.
American Dental Society of Europe	Aug. 3-6	Paris	F. D. Derrick Secy.	140 Park Lane, London, W. 1
American Public Health Association, Seventy-Seventh Annual Meeting	Oct. 23	New York	R. M. Atwater Secy.	1790 Broadway New York 19
American Society of Oral Surgeons, Thirty-First Annual Meeting	Oct. 12-15	San Francisco	Harry Bear Secy.	1112 E. Clay St., Richmond 19
Canadian Dental Association, Annual Convention	June 6-8	Saskatoon	D. W. Gullett Secy.	211 Huron St., Toronto
Federacao Odontologica Brasileiro, Fourth Congresso	July	Recife, Brazil	R. Ewerton	277 Avenida Rio Branco Rio de Janeiro
Greater New York Dental Meeting, Twenty-Fifth Anniversary	Dec. 5-9	New York	H. S. Horton Chm. Press & Publication	Rm. 106A, Hotel Statler, New York 1
Greater Pittsburgh, Annual Meeting	June 1-3	Pittsburgh	W. Earle Craig Secy.	206 Jenkins Bldg., Pittsburgh 22
International Association for Dental Research, Annual Meeting	June 24-26	Chicago	Edward H. Hatton Secy.	Northwestern University Dental School, Chicago
Midcontinent Dental Congress, Ninth Annual Meeting	Nov. 27-30	St. Louis	J. E. Brophy Secy.	Syndicate Trust Bldg., St. Louis
New England Dental Society, Annual Meeting	Oct. 5-6	Boston	A. R. Wilson Secy.	43 Farmington Ave., Hartford
Ohio College of Dental Surgery, Thirtieth Anniversary Reunion, Class of 1919	July 3-4	Cincinnati	F. W. Long Pub. Chm.	First National Bank Bldg., Norwood 12

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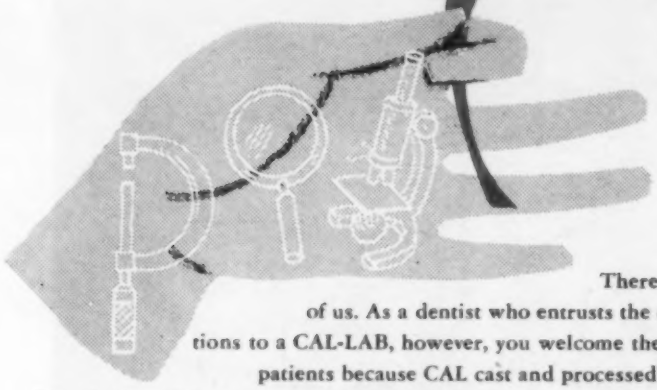

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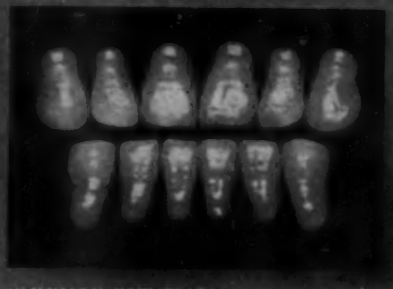

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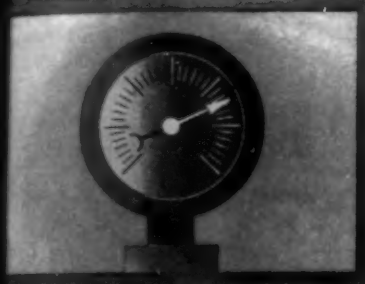

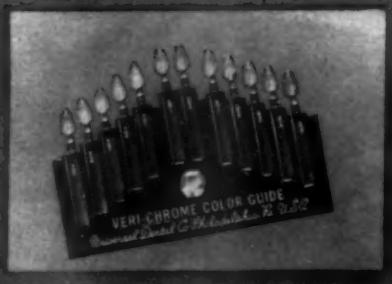

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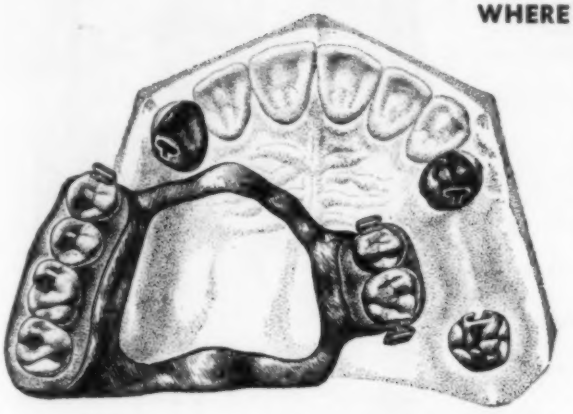

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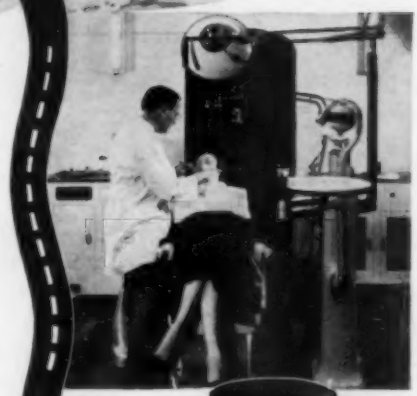

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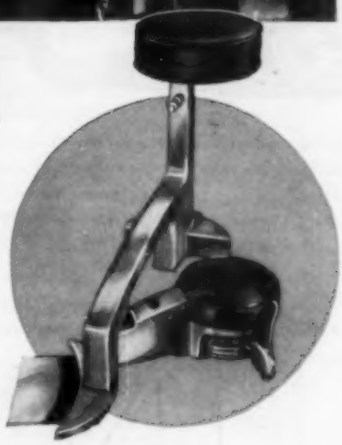

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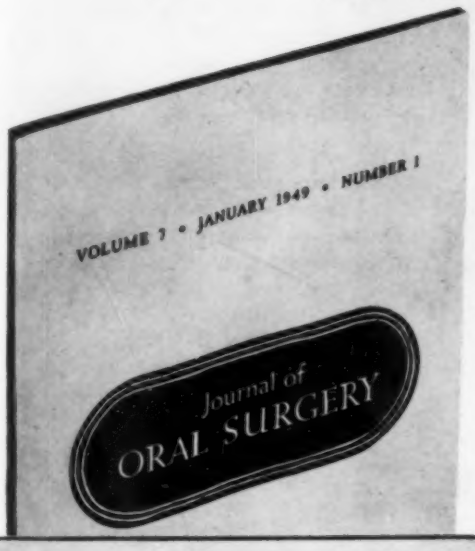

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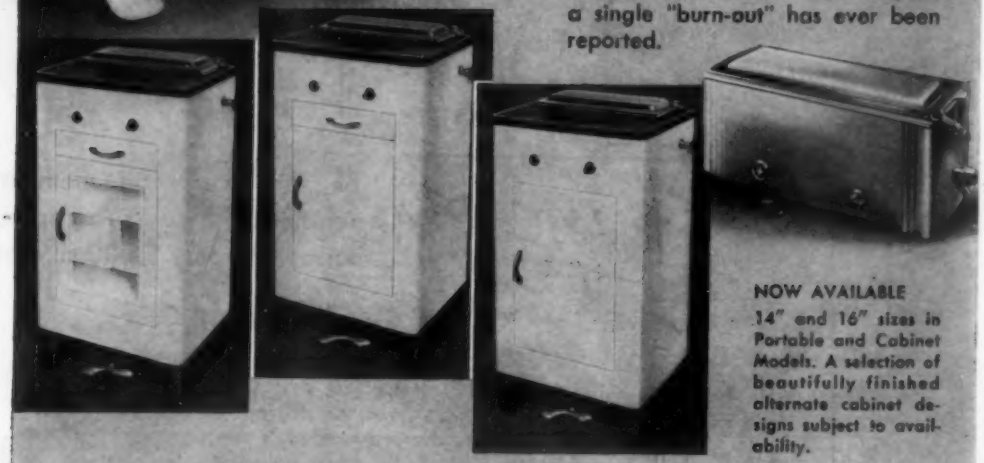

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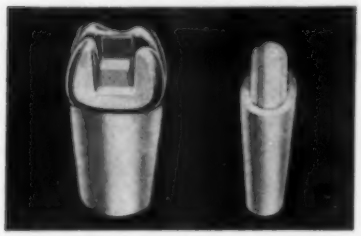

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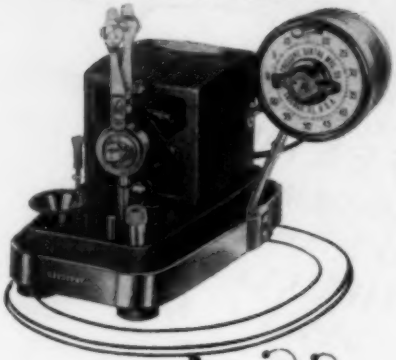

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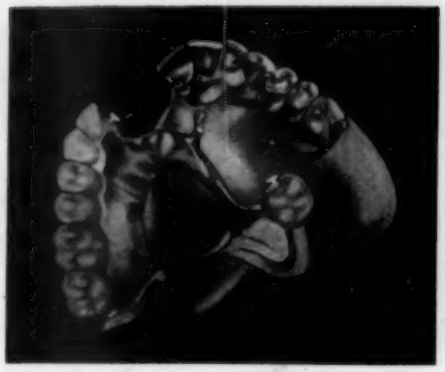

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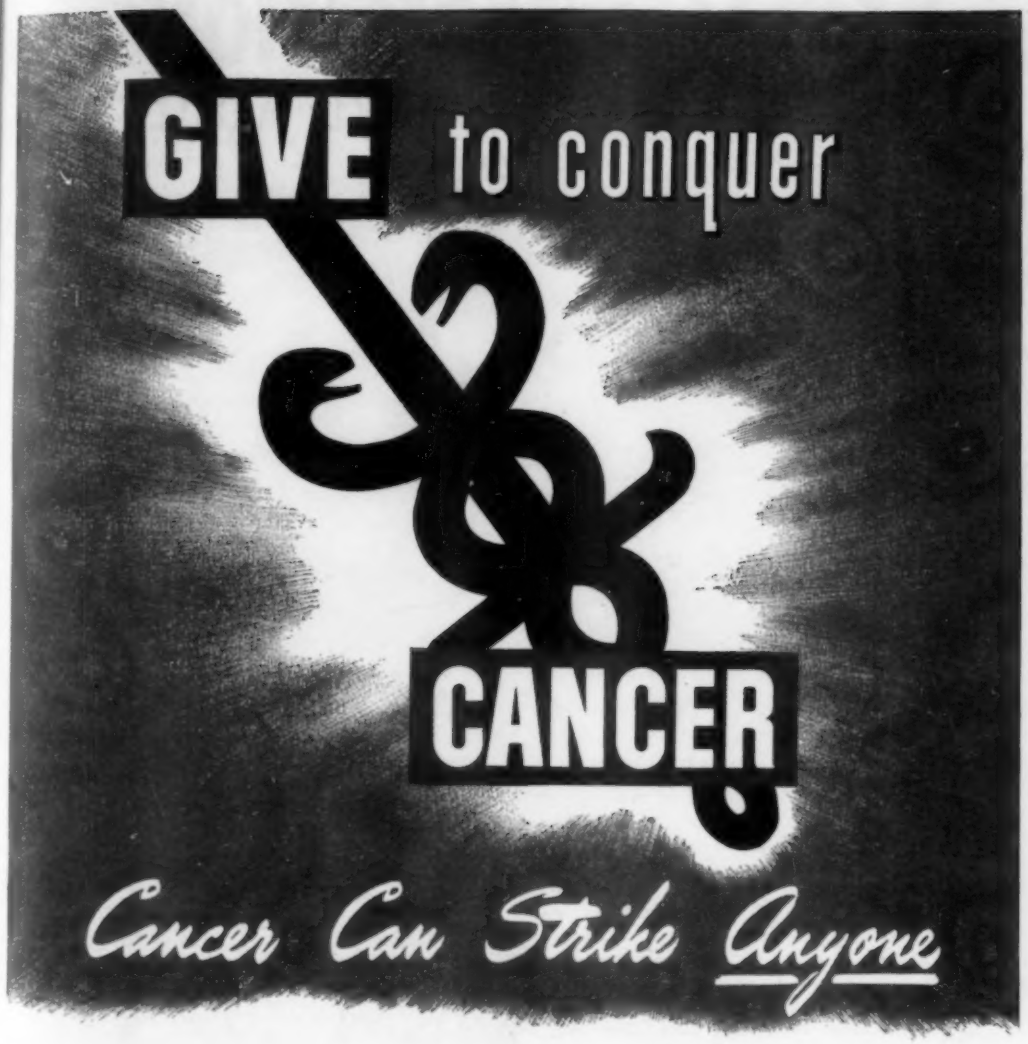

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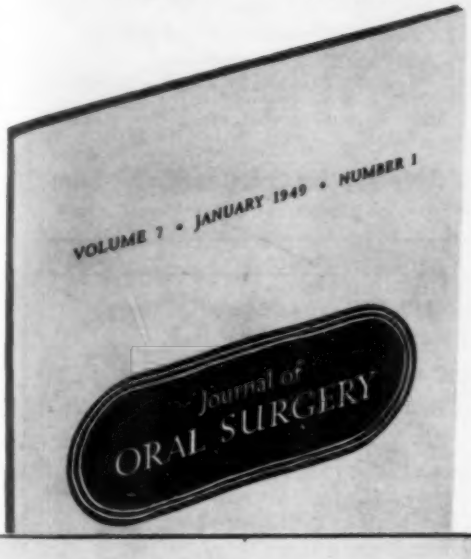

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neoantergen in doses of 50 to 100
taken every three hours for the adul

EFFECTIVE PENICILLIN LE
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The dosage should be such
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KEEP YOUR JOURNALS?

Then do it efficiently and inexpensively by getting

A. D. A. JOURNAL FILING CASES

These filing cases manufactured especially to fit your A.D.A. JOURNALS are again available. These cases are of light brown cardboard with dark trim and are printed to resemble hand-woven linen.

They are sold only in sets of two, one lettered Jan.-June and the other July-Dec. The numbers for the years 1941-1950 are included with each set. These dates are black and gold on gummed paper. The price of the filing cases is 50c per set.

AMERICAN DENTAL ASSOCIATION
222 E. Superior St., Chicago 11, Ill.

Enclosed is_____ for_____ sets of A.D.A. filing cases at 50c per set.

Name_____

Address_____

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Adaptable Metal Trays

For making individual trays for full upper and lower impressions. Made of a metal which is adaptable and tough. Shape easily, yet stand up under biting pressure. Made in soft and semi-hard.

SOFT
Box of 12 — $2.00 $1.00 per roll
SEMI-HARD
Box of 12 — $3.00 $2.50 per roll

Sold by Reliable Dealers Everywhere

Manufactured by
UNION BROACH CO., Inc.
37 West 20th Street New York 11, N. Y.

IMPROVED Automatic SURGICAL Mallet

Complete with 6 Points

$30.00

For use as a periosteal elevator and spreading of alveolar wall to *make extractions easy.*

Length and strength of blows can be regulated merely by turning chuck ring and palm handle cap.

Reduce shock and trauma to a minimum. The use of this advanced technique will reduce the need for many obsolete instruments.

Write for illustrated booklet.

Sold by Better Dealers Everywhere

UNION BROACH CO., Inc.
37 West 20th St. New York 11, N. Y.

"99.9% RIGHT"

—this dentist says . . .

(NOT ABOUT JUST ONE CASE, BUT THE HUNDREDS WE HAVE PROCESSED FOR HIM OVER THE YEARS)

● The point we want to emphasize in quoting this enthusiastic comment from a West Virginia customer is that most of the cases he entrusts to us are *cast removables*. For this reason, the quoted phrase is made all the more significant by its context:

> " . . . I deeply appreciate all the beautiful exacting work that you have made for my patients in the past years. I truly believe if I could check every case they would average 99.9% *right* . . . "

True, this could be said only because the preparations he sent us were 100 per cent right. But it also is convincing evidence of the precision with which the dentist's skill is matched by the Dresch-developed REPLICAST technic in processing all types of cast removables, as well as metal-base full dentures.

Yet these precision-cast appliances cost no more—often even less—than comparable cases produced by the customary empirical methods. Mail the coupon or write for further information.

REPLICAST ... A METHOD ... NOT A MATERIAL

The Dresch Laboratories Company
1009 Jackson Street—Toledo 1, Ohio

Tell me more about 'REPLICAST' precision removables.

DR._____

*Street Address*_____

*City—Zone—State*_____

J69

He started retiring today!

. . . and it feels good!

It's going to take time, but the point is . . . he's taken that all-important *first step* . . . he's found a way to make saving a sure, automatic proposition . . .

He's buying Savings Bonds, the safest investment there is, through the Payroll Savings Plan!

This makes saving an absolute certainty! You don't handle the money to be invested . . . there's no chance for it to slip through your fingers and . . . U.S. Savings Bonds pay you *4* dollars for every *3* invested, in ten years!

Think it over! We believe you'll agree that bonds are the smartest, surest way there is to save.

Then—sign up for the Payroll Savings Plan yourself, today! Regardless of your age, there's no better time to start retiring than *right now!*

P. S. If you are not eligible for the Payroll Savings Plan, sign up for the Bond-A-Month Plan at your bank.

Automatic saving is sure saving—U.S. Savings Bonds

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1948 TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION

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222 E. Superior Street
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HELPS PROTECT THE TEETH AND GUMS!

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CRYSTAL FILTER CIGARETTE HOLDER

The nicotine and tars trapped by Denicotea *never reach* the oral cavity. Moreover, the smoke is cooled in passage. *Thus cigarette stain and gum irritation are effectively reduced.*

PROFESSIONAL INTRODUCTORY OFFER: Write for Denicotea Holder, $1.00 postpaid, (regular price $2) Lady Denicotea, $1.75, (regularly $3.50) Alfred Dunhill, Dept. D, 660 Fifth Ave., N. Y. 19.

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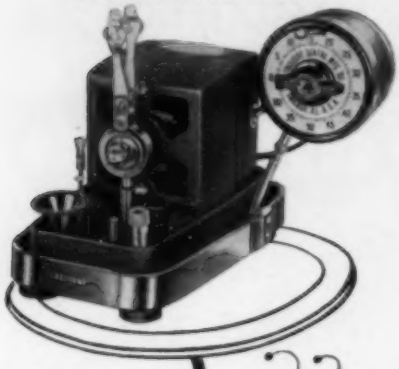

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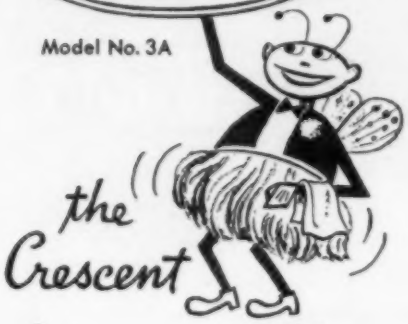

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Pat. May 21, 1940

Now . . . you can order this wonder electric-mortar-and-pestle and get delivery within thirty days. Although we have been making Wig-l-bugs in large numbers the demand has exceeded our supply for several years. Today, however, available materials and a stepped-up schedule permit our filling orders within a month.

The Wig-l-bug requires only 7 to 10 seconds to triturate enough amalgam for the average filling. It saves time, prevents waste, produces mixes with a smooth, fine texture. Use it with your preferred alloy.

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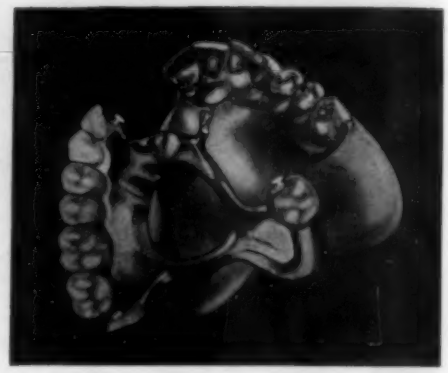

A cast gold upper partial with two precision attachments and one lingual rest.

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AS the country's leading advocate of precision attachment work, Peck places these restorations within reach of every dentist. You need only prepare the abutments for crowns, veneers or inlays. Our specially trained technicians carry out all the precision techniques for you. And to give these precision-made restorations the final touch of excellence, Peck's porcelain specialists provide hand-carved pontics to assure the perfect contact points and naturalness such work deserves.

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DEPTH WITHOUT DANGER

In an anesthetic *Safety* is the *First* consideration

MONÓCAINE

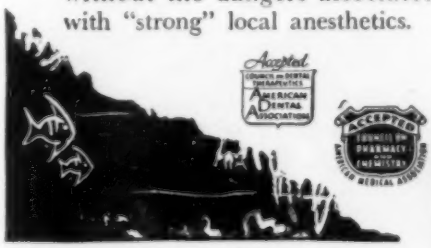
THE "SAFETY FIRST" LOCAL ANESTHETIC

COCAINE WAS an "efficient" anesthetic. It provided deep, powerful, long-lasting anesthesia. But the dental and medical professions discarded it because it provided depth without safety. Procaine replaced cocaine swiftly because of the safety factor.

GIVEN THEIR CHOICE, 98.6% of all users of Novol procaine solutions changed to Monócaine because Monócaine offers the advantage of deep, powerful anesthesia without untoward reactions . . . sufficient to eliminate pain . . . without the dangers associated with "strong" local anesthetics.

WHILE SAFETY is the first consideration, at the same time the anesthetic must be potent enough to assure the patient freedom from discomfort and pain. Monócaine is such a local anesthetic! Extensive clinical reports on Monócaine are available on request.

ONLY MONOCAINE offers every protection available to modern science. . . Vacuum Packing to assure freshness of each anesthetic container, Metal Cap Anestubes to afford an unbroken chain of sterile precautions, Acceptance by the American Dental Association and American Medical Association.



Monócaine is the registered trade mark of the Novocol Chemical Mfg. Co., Inc.

NOVOCOL CHEMICAL MFG. CO., INC.
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You can't beat "Lucitone"

DU PONT

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

Du Pont

for all-round Excellence

FOR EXCELLENCE IN DENTURES, IT'S THE COMBINATION OF QUALITIES THAT COUNTS

Thousands of dentists all over the country specify dentures made with Du Pont "Lucitone" acrylic resin base, because "Lucitone" combines the best in qualities desired by dentists, laboratory technicians, and patients.

Before its introduction, careful research went into the development of this composition. From the very beginning, "Lucitone" has been the leader in its field. And it continues to set the standards of excellence for denture materials. Du Pont scientists are constantly at work in the improvement of this denture base. Today, the gratifying results make "Lucitone" first choice of more and more dentists. Laboratory technicians, too, choose "Lucitone"—for its superior processing characteristics.

Next time you order a denture, remember: **year after year . . . Du Pont "Lucitone" is your assurance of the best in dentures.**

The best dentures require this combination of properties. You'll find them *all* in "Lucitone"

Lifelike Appearance. Naturally attractive. Color unchanged by exposure to light, food substances, and oral fluids.

Translucency. Mottled, translucent tissue tone blends with natural gingiva and provides a lifelike match.

Purity. The finest materials are painstakingly processed, tested and controlled to assure uniform purity.

Strength. Withstands flexing, bending, and other stresses in the mouth. Resists sudden blows and falls.

Abrasion-Resistance. Retains high polish and natural beauty because of resistance to scratching and pitting.

Dimensional Stability. Will not become distorted and lose shape. Withstands strains caused by chewing.

Freedom from Odor and Taste. Pleasant to wear. Won't become tainted by food and liquids in the mouth.

"LUCITONE" is the trade-mark for Du Pont acrylic resin denture material. "Lucitone" is distributed exclusively by the L. D. Caulk Company, Milford, Delaware, who will furnish literature on request.

"Lucitone" Sets the standards for denture materials

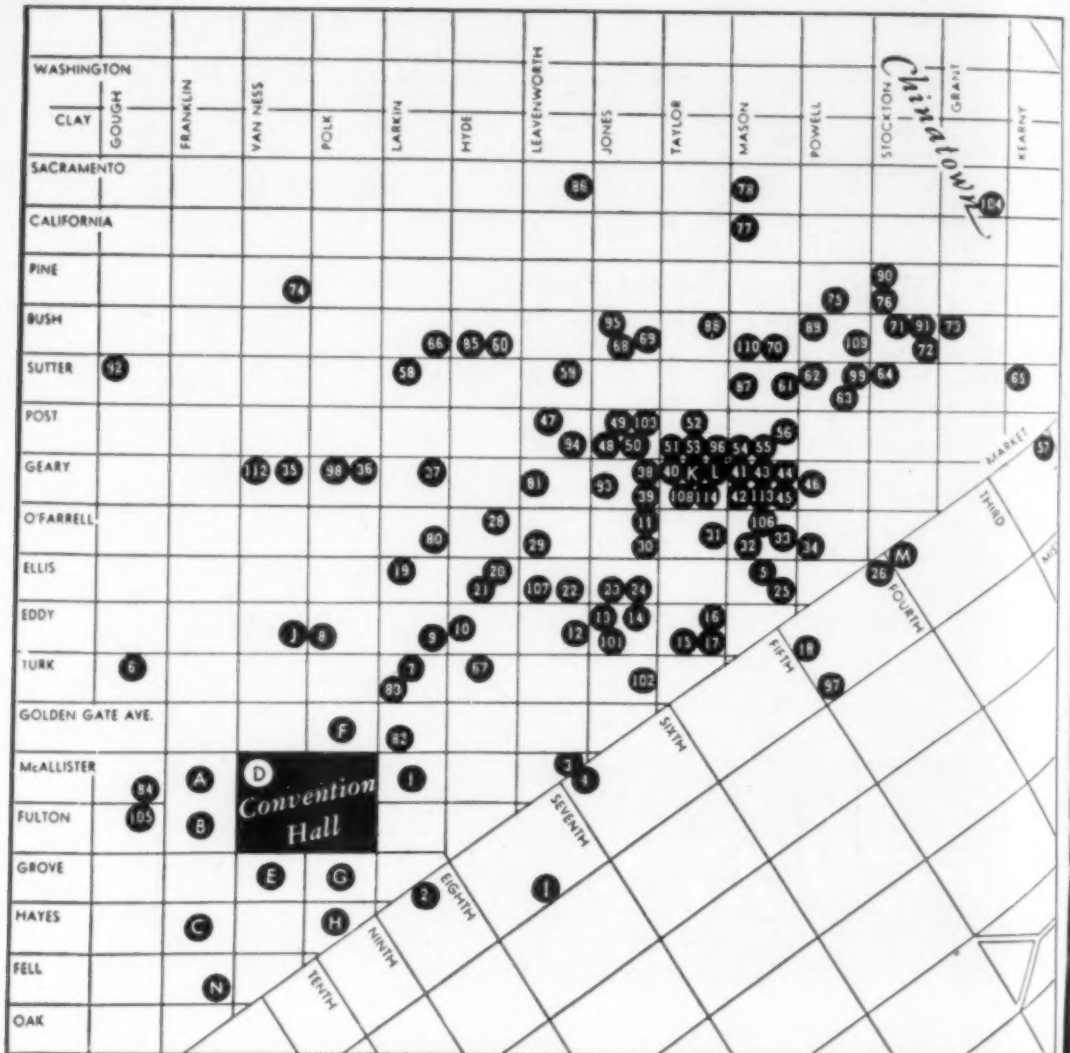
1. Applications for hotel accommodations must be made on the official "Application for Hotel Accommodations" form that appears on the next page.

2. Applications will not be accepted prior to May 1, 1949. Any that may be sent in before this date will be considered as of May 1, 1949.

3. All reservations must be made through the American Dental Association Housing Bureau in San Francisco. Do not send applications to the Local Arrangements Committee or the Central Office of the American Dental Association.

4. Read the classification list—above right—and enter your classification by number at the place provided in the application form. If you classify in more than one category, give all classifications. Only those persons who can qualify under at least one heading are eligible for rooms through the American Dental Association.

5. Reservations secured as a result of misrepresentation of eligibility status will be cancelled.



CLASSIFICATIONS

1. Alternate Delegate, A.D.A.
2. Chairman, A.D.A. Council
3. Clinician, A.D.A.
4. Dealer, Dental (non-exhibitor)
5. Delegate, A.D.A.
6. Dental Assistant
7. Employee, Dental Laboratory
8. Employee, Dental Society
9. Essayist, A.D.A.
10. Exhibitor, Commercial
11. Exhibitor, Scientific
12. Hygienist, Dental
13. Member, 1949, A.D.A.
14. Member, Foreign Dental Society
15. Officer, A.D.A.
16. Officer, A.D.A. Section
17. President, State Dental Society
18. President, Local Dental Society
19. Secretary, State Dental Society
20. Secretary, Local Dental Society
21. Trustee, A.D.A.

HOTELS AND RATES

Map No.	Hotel*	Singles	Doubles	Twins	Suites
28	Alexander Hamilton	$5.00	$6.00		$7.50
38	Bellevue	6.00		$8.00	12.00
39	Californian	4.00	6.00	7.00	15.00
68	Canterbury		5.00—$6.00	6.50—$7.50	
61	Chancellor		5.00	6.00	
40	Clift		9.00	9.50—14.00	27.50
64	Drake-Wiltshire	3.00—$4.00	4.00— 5.00	6.00— 7.00	
8	Embassy		4.00	4.50	
78	Fairmont		7.00—12.00	7.00—12.00	20.00—$26.00
48	Gaylord		4.50— 6.00		
45	Manx	3.50	4.50	6.00	
77	Mark Hopkins	7.00— 9.00		10.00—14.00	20.00— 30.00
57	Palace		8.00—11.00	9.00—12.00	18.00— 35.00
63	Plaza		5.00— 6.00	6.50— 8.50	
56	St. Francis		8.00— 9.50	8.00—14.00	18.00— 20.00
62	Sir Francis Drake	6.00— 7.00	8.00—10.00	9.00—11.00	16.00— 25.00
43	Stewart		4.00— 5.00	5.00— 7.00	9.00
2	Whitcomb	6.00— 7.00	7.00— 9.00	8.00—10.00	12.00— 27.00

*This is only a partial list of the participating hotels. Since San Francisco is a city of many good, though small, hotels, it was impossible to list them all.

APPLICATION FOR HOTEL ACCOMMODATIONS

NOTE: Single Rooms are very limited in number. Please arrange to share double or twin-bedded rooms.

A.D.A. HOUSING BUREAU, 200 Civic Auditorium, San Francisco 2, Calif. Date_____1949

Preference in choice of hotels:

First_____ Second_____ Third_____ Fourth_____

Please reserve the following:

_____ Double Room(s) Twin Beds	Rate $_____	to $_____ per room
_____ Double Room(s) Double Bed	Rate $_____	to $_____ per room
_____ Parlor and one Bedroom	Rate $_____	to $_____ per suite
_____ Parlor and two Bedrooms	Rate $_____	to $_____ per suite
_____ Single Room and bath	Rate $_____	to $_____ per suite

Arrival Date_____ Hour_____ A.M. P.M. By ☐ Rail ☐ Auto ☐ Plane

Departure Date_____ Hour_____ A.M. P.M.

Are you attending a previous meeting?_____ If so, specify which meeting_____

Note: Confirmation will be sent to the applicant by hotel accepting this reservation.

Give names of persons to occupy each double room, twin, suite, etc.

Name	Address	City	State

Please attach list of additional names, if necessary.

Give name of firm if Commercial Exhibitor or Dental Dealer_____

Name_____ Classification (See Instruction 4)_____

Street Address_____ City_____ Zone_____ State_____

Atlas of Oral and Dental Pathology

4th EDITION

Clinical records, photographs, and histopathologic material gathered by the nations leading authorities. This wealth of material under one cover adds up to a "must" for the dental library. Primarily designed for the oral surgeon, the new Atlas of Dental and Oral Pathology is a ready reference source for many unusual conditions to be encountered in general practice as well as in the specialties. At present the Atlas is widely used by dental schools as a combined laboratory and academic text. Prepared by the Army Institute of Pathology, the new 4th edition contains 310 pages of authoritative information and is priced at $7.00.

Order directly from
ARMY INSTITUTE OF PATHOLOGY
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Elegance in armor

Fit like a glove—never wrinkle, sag or bulge—no "clamminess" in winter—*no uncomfortable "stickiness" in summer!*
Handsome as a fine suiting . . . ruggedly protective as rhinoceros hide . . . enduring as the Sphinx (or almost) —such are J & J's Professional Chair Covers made of the remarkable woven plastic fabric, LUMITE.*
Its lustrous brightness—impervious to sun, dust, dirt, dampness, salt air, rot or mildew—won't change . . . no scuffs, rips, tears or raveling under normal usage. Readily cleaned with soap and water, or cleaning fluids, if spotted.

Available:
Special exclusive set for S. S. White motor chairs. Standard set to fit all other chair models.

**Trade-mark of Chicopee Manufacturing Corp. of Georgia, a subsidiary of Johnson & Johnson.*

DENTAL DIVISION
Johnson & Johnson

Professional chair covers

A MESSAGE ON THE IMPORTANT SUBJECT OF

Ammoniated Dentifrices

★ ★ ★

The potential therapeutic value of ammoniated dentifrices in reducing tooth decay is being widely publicized. Taking advantage of this publicity, numerous "ammoniated" tooth powders and pastes have appeared on the market. Thus, it is important, Doctor, that we again bring these facts about Amurol to your attention:

1 AMUROL is based on a formula developed by University of Illinois scientists as a result of years of research in the etiology of dental caries.

2 AMUROL is a clinically tested balance of Urea (Carbamide) and Dibasic Ammonium Phosphate to check agents destructive to tooth enamel and dentine *without affecting protective enzyme action.*

- it markedly reduces Bacillus Acidophilus in saliva
- neutralizes and inhibits lactic acid in the mouth
- is non-toxic and non-irritating

3 The Council on Dental Therapeutics of the American Dental Association has accepted AMUROL TOOTH POWDER for clinical trial. Its basic formula is referred to in the 14th edition of "Accepted Dental Remedies."

4 Consistent use of AMUROL tends to create an environment in the oral cavity similar to that found in individuals who are naturally immune to tooth decay.

5 AMUROL is unsurpassed as a tooth cleanser. Has a pleasing taste, and a prolonged refreshing action.

Knowing these facts as well as Amurol's scientific background, you'll want to continue recommending Amurol to your patients with full confidence. We will be happy to send you a professional sample on request.

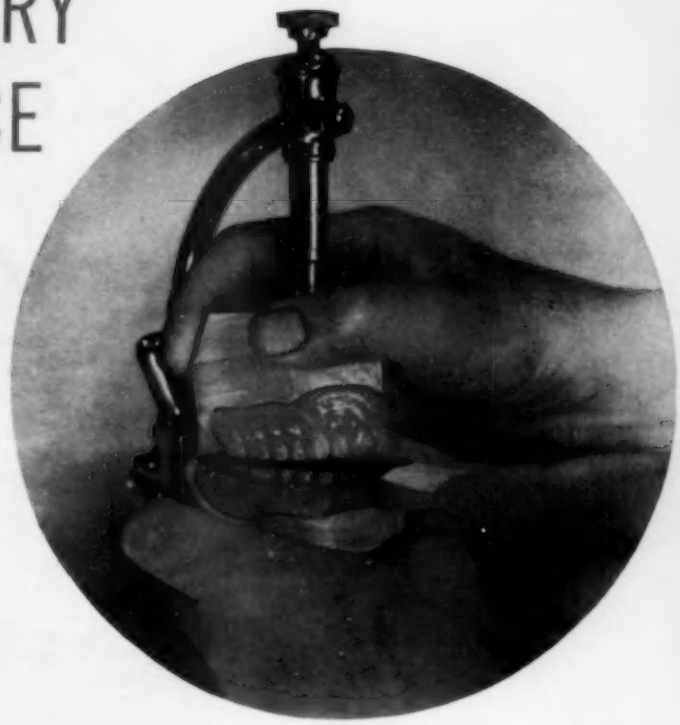
Amurol

AMMONIATED TOOTH POWDER

THE OFFICIALLY RECOGNIZED BASIC FORMULA

Distributed by Amurol Products Co., Chicago 5, Ill.

LABORATORY SERVICE keeps growing in value!



Dentists depend more than ever on good laboratory service. And good laboratories are accepting the increased responsibility . . . thanks to continuing developments in technics and in material. Du Pont and Caulk, matching the forward strides of laboratory science, have made *Lucitone* better and better with each year . . . more lifelike, more comfortable, more durable. *Lucitone*, the last word in prosthetics, means lasting satisfaction for the patient.

YOU'RE SURE WHEN YOU SPECIFY

LUCITONE

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Lucitone is the trademark of Du Pont acrylic denture material manufactured exclusively for, and packaged and distributed by, The L. D. Caulk Company.

For modern materials call on *Caulk* Milford, Delaware

INSURE *Chairtime*

WITH PRODUCTS AND TECHNIQUES

New ideas, new processes, new materials and techniques . . . outstanding products of the original research of Austenal Laboratories . . . embody scientific and technical developments that have created higher standards of prosthetic excellence and of dental laboratory service to the profession.

PRESCRIBE THROUGH YOUR

**Austenal Research*

AUSTENAL LABORATORIES, INC.
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VITALLIUM—The original and the *best* cobalt-chromium alloy.

MICROMOLD TEETH—Natural tooth reproductions in both porcelain and plastic.

MICROCAST PROCESS—A precision casting technique for Vitallium.

VITALON—A methyl-methacrylate complying with A.D.A. Specification No. 12.

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it's mor *to a testing laboratory*

but it means

patient comfort
to you

To a testing laboratory, Durallium's high performance rating is merely figures taken from a series of tests and expressed in pounds per square inch . . . tensile strength, 112,200 LB./IN² . . . crushing strength, 242,200 . . . elastic limit, 88,000.

To you, Durallium—outstanding chrome-cobalt alloy—has equally technical but more important dental significance in terms of patient comfort. The extra patient comfort is the result of Durallium's resistance to torque . . . its maintenance of original fit even under continuous stress . . . and its resiliency, which reduces strain on abutment teeth.

However, whether mechanically tested in a physics laboratory—and measured in terms of physical symbols—or subject to prolonged clinical use, Durallium offers this all-inclusive advantage: its physical characteristics make for maximum convenience in both preparation and use.

available through your qualified Durallium laboratory
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it has NOW become

OLD FASHIONED

...to stand up while you operate!

More and more dental colleges, their students and faculties are indorsing the Rota-Seat technique every day. They realize it's an old fashioned idea to think a dentist has to stand up to do his work. Dentists are adopting this new "sit-down" method and are doing better work, getting closer to the patient, and are feeling as fresh and relaxed at the end of the day as when it began.

basic features:

- Use your regular equipment—nothing else to buy.
- Rota-Seat is always there—it can't push away from the chair.
- Foot control switch moves when you do.
- Day long comfort—no lost motions—stand instantly when necessary.
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- Feel better—work better—get new operating comfort with ROTA-SEAT.

We have prepared a fully illustrated booklet showing how Rota-Seat can relieve fatigue and its use in every operating position. Send for your copy today.

Ask your dental supply dealer to show you how easy it is to operate from Rota-Seat in your office.

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HARD — GOLD
WHICH HAS:

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The Burnishability of Type A or Type B Golds, assuring ease in finishing margins.

For Gunsmithing and All Crown and Inlay Abutments

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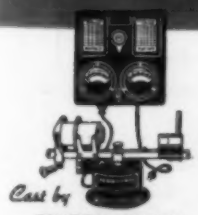

Cast by THERMOTROL

J. F. Jelenko & Co., Inc.
Manufacturers of Dental Golds & Specialties
136 West 52nd Street · New York 19, U. S. A.

PRICE per dwt. $2.10

Aphrodite, the goddess of beauty, represents the epitome of that most important of human instincts—the desire for impressive personal appearance, *the* desire that is paramount when patients come to you for appliances. You can entrust the construction of their full and partial dentures to the CAL-LAB near your office because all of the laboratories in this service group are both expert and experienced in combining prosthetics and cosmetics. They achieve natural esthetics in these definitive ways: care in designing cases that effect retention and adaptation with only a minimum of metal showing, close co-operation in carrying out your specifications—using the materials, metals, and teeth that fulfill your requisites—and, finally, characterizing your restorations by anatomical carving, color blending, and applying your patient's own individual markings. For life-like esthetics, understanding service, prompt attention—call your CAL-LAB today.

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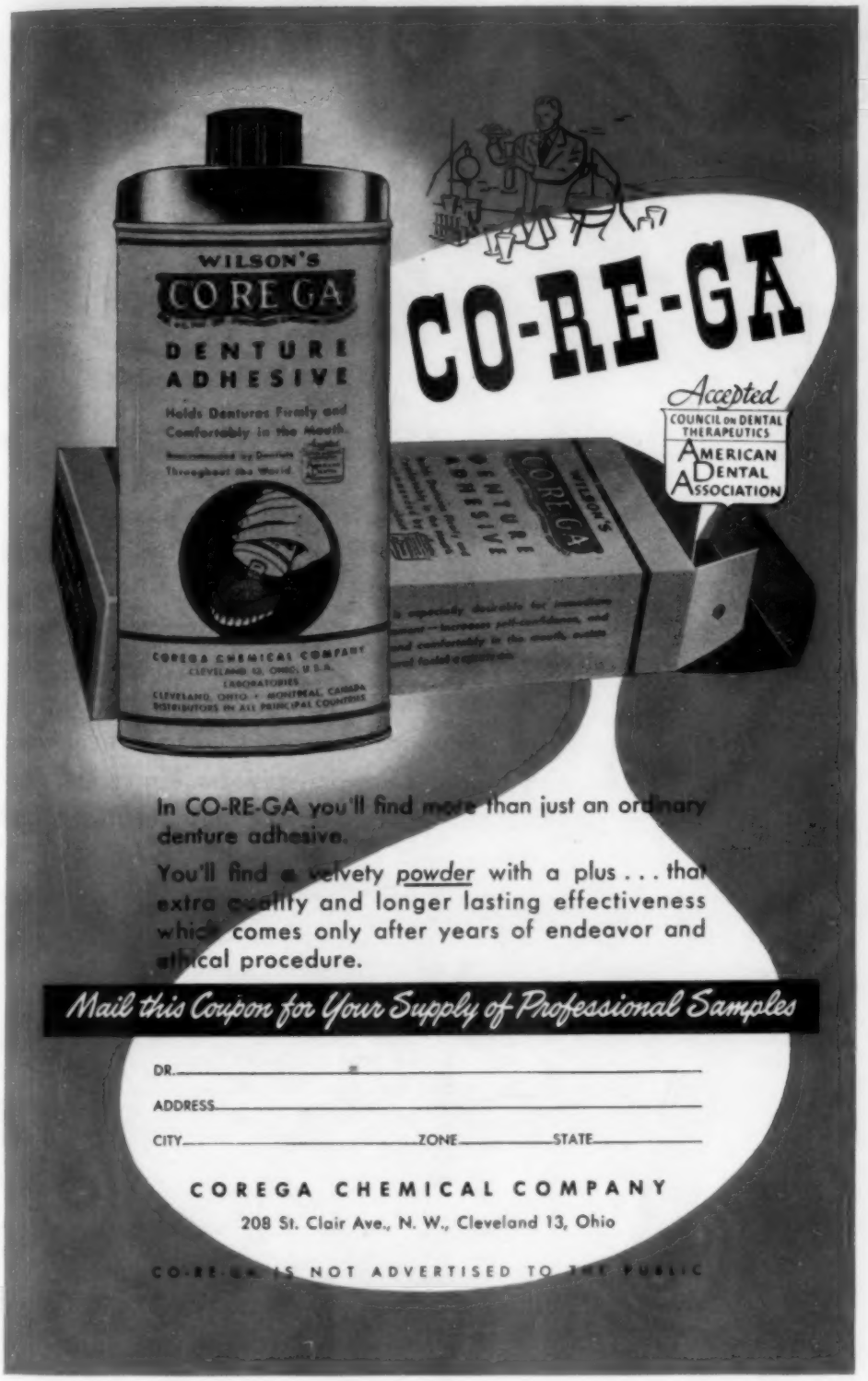
the CAL-LAB Group

Do You read CAL magazine?
Ask your CAL-LAB to send it to you!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Holds Dentures Firmly and Comfortably in the Mouth
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COUNCIL ON DENTAL THERAPEUTICS
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In CO-RE-GA you'll find more than just an ordinary denture adhesive.
You'll find a velvety powder with a plus . . . that extra quality and longer lasting effectiveness which comes only after years of endeavor and ethical procedure.
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but...

It's no good in the patient's pocket or bag! How disheartening it is to see professional skill of the highest order go for naught when patients—for anatomical or psychological reasons—fail to wear their new dentures! A pleasantly effective, yet simple means by which many dentists gain full patient cooperation (so important during the first critical weeks) is by using Wernet's Powder at the final insertion, and by recommending its use during the adjustment period.

The soft, adhesive cushion formed by Wernet's Powder between sensitive gums and unyielding denture promotes comfort, instills confidence, and materially hastens complete mastery. Use the coupon now for a complimentary office supply.

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190 Baldwin Ave., Jersey City 6, N. J.

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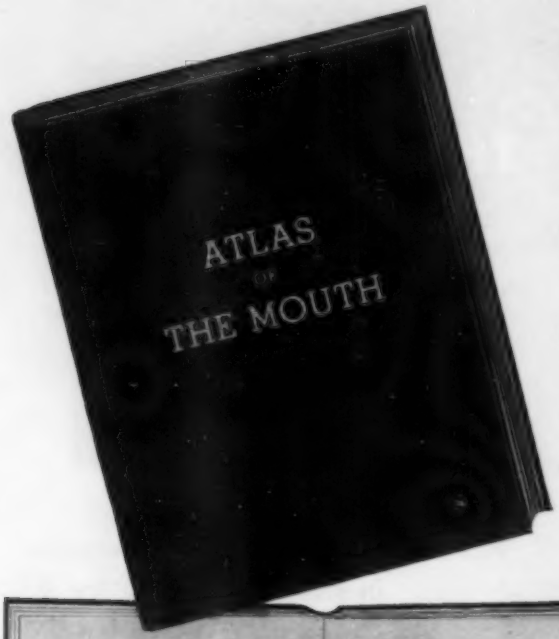

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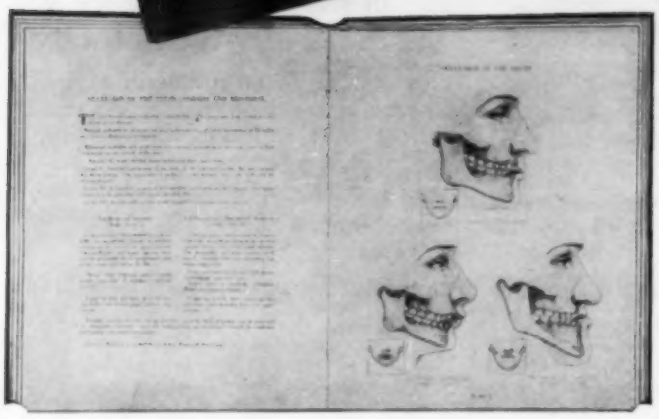

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Public health dentist; M.P.H.; past several years, dentist, state department dentistry; for further information, please write Burneice Larson, Medical Bureau, Palmolive Building, Chicago.

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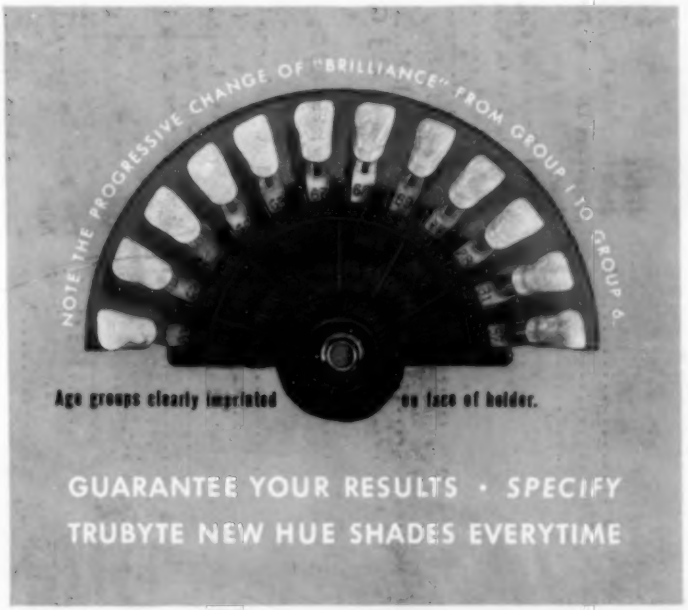
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